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PREVENTIVE MEDICINE IN RURAL CANADA

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THE new Health Insurance Act rightly places emphasis on preventive medicine and, so far as possible, early diagnosis. From reading the different presentations made to the Parliamentary Committee on Social Security and articles in newspapers and medical journals, it is apparent that the term prevention of diseases is frequently used in a very narrow sense. When one begins to plan for an organization to prevent disease, one should lay a foundation broad enough for the organization formed to bring into the fight all forces and agencies which in any way can assist in the prevention of physical and mental disability.

In considering the improvement in general health in the British Isles during the 19th century and trying to decide what important changes were most responsible for that improvement, I am impressed by the importance of the part played by improved sanitation, abolition of child labour, and improvements in food supplies, a result of better horticultural and agricultural practices. These three probably did more for the health of the people of the British Isles than any improvement in medical knowledge or practice. It is only in the present century that increased medical or surgical knowledge has become an important factor in improvement of health.

In many parts of rural Canada advances in sanitation have not kept pace with increased density of population. Housing not only has not improved but is not as good today as it was forty years ago. I would suggest, therefore,

that the problems of rural Canada in prevention of disease are not the same as in urban Canada, or, at least, the problems are not in the same order of relative importance. It may be that in the next twenty years the contribution of non-medical agencies will be of more benefit to the welfare of the people than purely medical contributions, as were the non-medical agencies in Great Britain in the 19th century.

In rural Canada I would suggest the following problems, without attempting to specify which are most important.

1. *Sanitation.*—The providing of a water supply is seldom a co-operative enterprise but is a separate problem for each individual family. And on the farm or in a small village it is a problem of preventing the contamination of the well by seepage from privy or barnyard manure. In most rural areas and especially in villages almost all wells are contaminated to some degree at some season of the year. Those areas in which a water-bearing limestone stratum is available for deep wells are fortunate. Other areas that must depend upon water from a spring run-off collected in a small lake, stream or periodically dry watercourse are most unfortunate because of the almost universal pollutions of such by sewages, factory or other wastes.

2. *Nutrition.*—By nutrition I mean education of the people to grow or buy the proper foods, to use them in the proper manner and protect them from contamination from source to table, including the physical means, such as refrigeration, necessary for such protection. When one has seen in the month of August a community of 1,500 people in which every child under ten years either was suffering from at the time or had had diarrhoea in the two preceding weeks one realizes the importance of protecting food and controlling the fly problem.

3. *Proper housing and clothing.*—I need only mention the investigations conducted in the British Navy on the relationship between ship accommodations and rheumatic fever, or the number of men rejected by the army because of hammer toes, bunions, and flat feet resulting from improper shoes.

4. *Mental hygiene.*—It was generally known after the last war that, when investigating the neurosis or psycho-neurosis of a soldier, the genesis of the neurosis was almost always found in childhood and that proper care and training in childhood could have prevented the trouble. It is quite apparent, therefore, that there is here an almost unexplored field of endeavour. In Canada we need to find out, first, how children should be trained, and then pass on those findings to parents and teachers so that the neurotics will be few or non-existent.

5. The immunization procedures by which we can control specific infectious disease.

Now what part can the general practitioner take in this program? It is evident at once that he can do much alone and that he is trying to do much alone at the present time. It is also evident that he needs the co-operation and assistance of many other agencies, particularly of sanitary engineers and architects. To speak specifically of the program of immunization and periodic examination of school children, too many people think that a doctor can go to a school, examine the child, administer toxoid or vaccination, decide that certain children should have their tonsils removed and that others should have iron, etc. Now that kind of performance is not fair to the victims, the children. The proper place to examine a child is in the doctor's office with the mother present. The history of earache, deafness, quinsy, growing pains, etc., is much more important than the appearance of his tonsils. We would not consider sending a woman or a man to the hospital to have his or her gall bladder removed as a result of a similar examination in the same schoolroom. Surely the child is entitled to the same consideration. He should be examined in the doctor's office, alone with his mother, and a careful history taken. The doctor's office is the place and the only place to examine children and, incidentally, the place where toxoids should be given and vaccinations done.

What the relationship of the physician to the other agencies should be I am not prepared to

say, and at the moment that is not the important consideration. What is important at the present time is that the people of this country should realize that we are not doing our best for the next generation unless we pass on to them unpolluted streams, water supplies that are bacteriologically clean, land that will produce good and sufficient food supplies with the means of protecting such food from source to table, proper housing and clothing; and, finally, the knowledge which will aid them to raise their families with a clearer understanding of what they are doing than we, the parents of their present generation, have had.

For the effect of polluted drinking water one should turn to the article by Bews and Choquette (*this Journal*, 1943, 49: 501). These observers found in 500 unselected admissions to a military hospital in Canada in a six-weeks' period in 1943 that approximately half the men in this survey had some form of protozoal cyst. This means that at some time they had been exposed to relatively fresh faecal contamination of food or water supplies, and that this occurred in a country where sanitation is considered good!

PROSTHETIC FACE RECONSTRUCTION*

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WITH the present popularity of four thousand-pound bombs, aircraft fire-power, rocket guns, and the gyrations of tanks and effects of anti-tank armament, one wonders what the toll will be in face mutilations. Even the last war gave much scope to the artistic ability of Ladd, to remould shattered French faces in wax and vulcanite. With our troops entering active areas in increasing numbers it is reasonable to expect many a Canadian soldier to return in the next few years, minus one or more of his desirable features. New materials of rubber, metals and plastics are available for face reconstruction. Have we available, in our multiple armed services and

* From the Montreal General and Saint Mary's Hospitals and assisted by the National Research Council.

the Department of Pensions and National Health, the necessary facilities and set-ups, to exploit these materials to their maximum?

To operate, or not to operate, may become a question, not only of surgical but of economic importance. A European surgeon recently wrote of the construction of an orbit in five operations.¹ The orbit, so-constructed, was a surgical masterpiece and reflected great credit on the surgeon's surgical ability. Yet it was a flabby, fish-like affair, an aesthetic and economic monstrosity in five instalments at tremendous cost. A rubber, glass-eye orbit, of the type hereinafter described, might well have been made at one-fifth the cost and with five times the satisfaction.

Occasionally it becomes advisable to subdue one's surgical zeal, knowing full well that a surgical prosthesis will fill the bill to the patient's better advantage. In fussing with the tedious plastic operations of orbit and ear, one frequently mutters the wording from a popular song, "Only God can make a Tree", substitutes "eye" or "ear" for the word "tree", and is tempted to limit his surgical endeavours accordingly. Certainly modern prosthetic materials lend themselves more readily to copying the natural. Delicate folds and contours can, on them, be more readily impressed and carved than is ever possible on unwieldy, flabby, human flesh.

VARIETY OF MATERIALS USED

In the past, wax, paraffin, celluloid, gelatin, cellulose acetate, corn starch, vulcanite, aluminum and gold have been the surgeon-prosthetist's armament. The use of each was fraught with tedium, difficulty and disappointment. The hopeful maker of features flitted from one material to the next, drawn on by the enthusiasm of their exponents, only to wind up with a poor result.

I recall vividly the tedious, multiple-stage construction of a gelatin-cornstarch nose after the formula of a Russian worker,² probably from the colder Siberian slopes. The "nose" was transferred gingerly to replace the patient's mutilated member, and held in position just long enough to pose for a photograph before, under the effects of Montreal mid-summer humidity, it melted into a sticky mass.

The metals came in for their share of trial

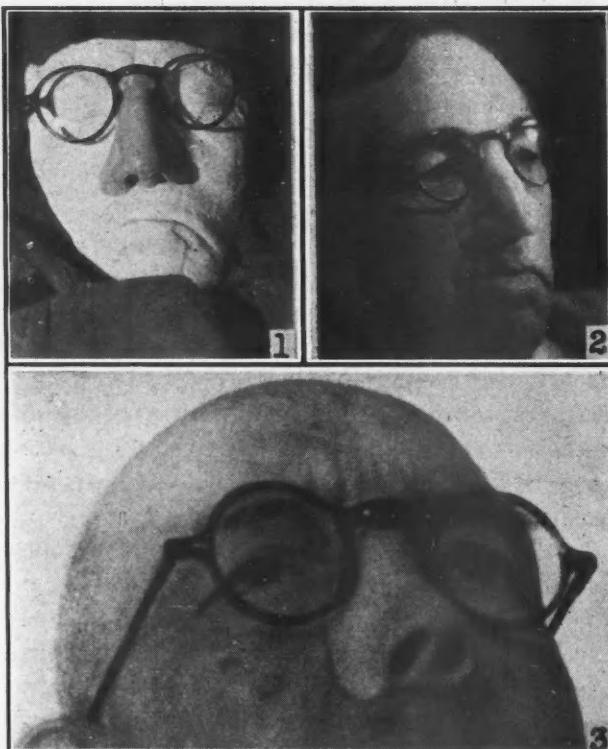
and error. Axt,³ in 1927, evolved an interesting ear with a gold base and an electroplated brass and copper periphery which was pigmented with celluloid Zapon paints. The same author followed in 1928⁴ with an ingenious cast aluminum upper lip and cheek, with stippled surface to aid in paint retention, and a flowing "handle-bar" moustache. Olinger and Axt⁵ consummated this type of metal work in 1936 with, among other interesting metal prostheses, an electro-deposited silver nose. Aluminum, vitallium and tantalum⁶ (Fig. 1) have all been put to the test but have obvious disadvantages of construction and result.

Vulcanite or vulcanized rubber—the material artificial dentures are commonly made of—has long been the prosthetist's stand-by. It lends itself readily to fitting into cavities of mouth and nose and will "plump out" fallen cheeks, chins and noses. It comes from the manufacturer in shades of red, pink, black and olive, and techniques of carving, packing, investing and vulcanizing are well-understood by our dental confrères. At best, it produces flat features taxing to the limit the skill of an ingenious and imaginative artist to paint thereon a life-like combination of colours. It was used to great advantage in the inter-war period by Gillies,^{7, 8} to build out chins and raise hopelessly sunken saddle-noses, and by Kazanjian and his colleagues⁹ in the production of some excellent orbit, nose and palate reconstructions. It was a good material for intraoral and intranasal use, but is being replaced by the newer plastics or acrylic resins.

These newer plastics, the polymerized resins, developed to such a high degree of excellence by dental researches in search of the ideal denture material, have much to offer. They are light, translucent and well tolerated. They make delightful obturators and other intraoral restorations but, as face features, they have been until the advent of some recent research materials, cold, flat, shiny, and difficult to tint to an acceptable skin colour (Figs. 2 and 3).

Just prior to the outbreak of war, in 1939, the whole subject of facial prosthesis was given a welcome stimulus by the outstanding work of Bulbulian¹⁰ in collaboration with the Cambridge Rubber Company. He found that raw latex rubber had a remarkable skin-like texture and feel, produced some startling results, and outlined simple methods of construction and

colouring. The same author followed quickly¹¹ with further refinements of technique, making excellent ears and noses. This material was definitely superior to those previously in use, but had disadvantages of shrinkage and discolouration or oxidation of the pigments with age. Brown¹² furthered Bulbulian's work and produced¹³ an almost complete face mask of dramatic realism. He carried the work further afield¹⁴ in the reconstruction of amputated breasts with the same material and by similar technique. Bettinger, of New York, has carried



Figs. 1 and 2.—A hard acrylic nose. The material is hard, shiny and cold and difficult to tint to any semblance of a skin colour. This same material makes excellent intraoral appliances and is well tolerated by the mouth tissues. Artificial eyes are being produced of the same material. **Fig. 3.**—An aluminum nose. Extremely hard, uncomfortable and difficult to paint. The edges to appear well must be almost knife-like.

this material to a very high degree of perfection in making remarkably life-like and useful forearms, hands and fingers, forming the rubber substance about a wire cribbing which permits bending the fingers to a degree of usefulness. Through all this work runs the one blemish of limited durability caused by shrinkage and change of colour.

Before going overseas in the present conflict and since my return to civilian duties I had occasion to work on several prosthetic problems, using latex rubber, and following gratefully the

technique and suggestions of Bulbulian with certain minor modifications and additions. The problems under construction were the usual ears, noses and, especially, an orbit. As the construction of the orbit brought out several difficulties peculiar to the anatomy of this region, its construction will be described and illustrated in some detail in the following case.*

CONSTRUCTION OF AN ORBIT

Mrs. X., aged 50 years, had lost her right eye and orbital contents some seven years previously with the successful removal of an orbital sarcoma. She had been condemned to a ground glass lens with hooded metal spectacle frame (Fig. 4), with all its unpleasantly obvious features. The orbit was clean and well-covered with a firm skin (Fig. 5). There was no vestige of the upper and lower eyelids, the orbital margins being covered with uniformly firm, shiny skin.

A plaster mask and sectional plaster model were made of the face and deformed orbit (Fig. 8). The mask was made after a technique described by Gerrie and Ginwalla¹⁵ permitting an overall study of the reconstructive problem in the patient's absence. The two-sectional plaster model was made of the deformed orbit, using negocoll as the impression material to obtain accurate reproduction of the undercuts. This sectional model permitted the carving of a wax orbit on a sound base and its removal and transference to the patient's orbit for trial, without distortion.

The sectional model was filled with a "blob" of red dental base-plate wax, the appropriate glass eye selected and embedded at the proper depth and covered with a single thickness of the wax. Then followed the tedious process of carving the wax orbit. The position of the pupil was measured and corrected and the dimensions of the opposite palpebral fissure were marked off and cut out of the wax. The inner and outer canthi, caruncles, palpebral margins and wrinkles, were laboriously copied from the

* This work was done under the auspices of the Oral Surgery Department of McGill University and the Montreal General Hospital. Mr. Mildon, of the Barlow Optical Company, gave invaluable help in the selection and fitting of the artificial eyes, lenses and spectacle frames.

Further indebtedness is due to the Cambridge Rubber Company's Canadian Division and its manager, Mr. Steele, with particular reference to the use and satisfactory incorporation into the rubber of the desired pigments.

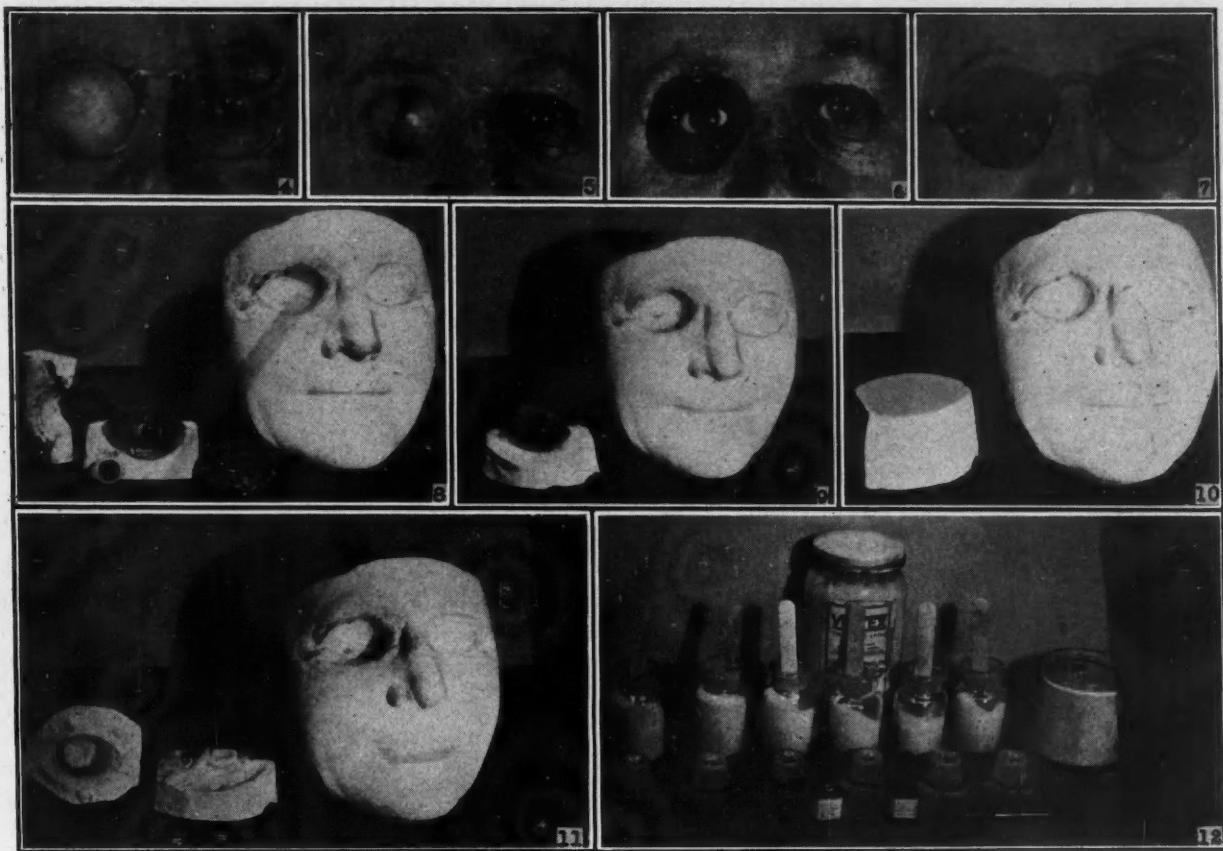


Fig. 4.—A latex rubber orbit reconstruction. The orbit camouflaged by a ground-glass lens with absorbent in the socket advertising the fact the patient is without an eye. **Fig. 5.**—The deficient orbit,—lids and contents completely removed. **Fig. 6.**—The red wax carving adjusted to the patient's orbit. **Fig. 7.**—The same filled with the completed latex rubber glass eye reconstruction. **Fig. 8.**—The plaster over-all mask study model of the face, a sectional model of the deformed orbit, two glass eyes and two wax carvings of the orbit reconstruction. **Fig. 9.**—Making the master mould. The wax orbit laid outer surface down in a plaster block. **Fig. 10.**—The whole wax orbit encased in a two sectional plaster block. **Fig. 11.**—The two sections separated and the wax boiled out, leaving the master mould. A funnel is cut down through the plaster of one of the sections to permit "pouring" of the rubber. **Fig. 12.**—Tinting the white rubber. Six bottles each containing 25 c.c. of vultex. Pigments red and ochre in front. These are added drop by drop in different proportions to each bottle.

sound orbit. Three such wax orbits were carved with slight variations of position and detail in each (Fig. 8). The wax was carved away from the back of the glass eye, allowing the latter to be pushed out backwards. It was then re-set in position and detachable ledges of wax were made behind the glass eye, above and below, to provide a rim in the final rubber orbit to receive the glass eye. These ledges were removed, the eye pushed out, and the ledges replaced. This gave the wax orbit, minus the glass eye, ready for "investing" and construction of the "master mould" (Fig. 9).

The master mould was made in two sections providing a form or casting to receive the raw rubber (see Figs. 9, 10 and 11).

Tinting the white rubber to an acceptable skin colour was even a more laborious process. Specimen bottles were set out, six at a time, each containing 25 c.c. of "vultex", the raw

rubber (Fig. 12). The bottles were numbered and in each was placed a varying amount of pigment; for example, No. 1 received one drop of vermillion, No. 2 one of vermillion plus one drop of ochre and No. 3 one drop of vermillion plus one drop of yellow. The raw rubber, so-pigmented, was then poured into the master mould, where it underwent spontaneous vulcanization at room temperature in twenty-four hours. The sections of the mould were then pried apart, freeing the contained rubber orbit. The selected glass eye was snapped into the rim of the orbit and the whole prosthesis was ready for trial. Some thirty orbits of varying shades were made and of these about three were of satisfactory shade. Their formulae were recorded for future use, as the rubber is not very durable, and re-casting may be required at intervals of about a year's time.

When the orbits were fitted into the patient's deficient orbit, it became obvious that lashes would enhance the result. Montreal cosmeticians were canvassed, but could produce only the glamorous drooping lashes of sweet sixteen, which were not in keeping with the kindly features of the patient. Finally some of the patient's axillary hair was clipped, a film of the liquid latex was streaked along the artificial lid margin and the axillary lashes embedded therein. On hardening of the rubber they were trimmed to produce a reasonably satisfactory result.

The orbit was now complete. The patient wore glasses to correct a minor refractive error in the good eye. It was felt these might aid in the further camouflage of the artificial orbit. We selected faint rose-tinted lenses and a pleasing plastic frame to cover the margins of the prosthesis. A small metal prop was incorporated into the frame to securely seat the prosthesis and give the patient an added sense of security.

This was truly a lot of work, not a surgical masterpiece, and yet a work of satisfaction and credit to any craftsman (Fig. 7). It is in brief, the technique of construction of a difficult latex prosthesis as in vogue early in the present war. It is, basically, the technique that will be applied in the use of other and newer materials, materials more durable and produced in basic skin tints easily modified by common cosmetics.

Rumour, or more than rumour, is already ripe of changes or modifications in the available plastics. It seems to be an age of plastic production. The vinylite resins lend themselves to minor alterations in formula and composition which make them particularly adaptable to the prosthetic field. Jaw splints, obturators, noses, ears and even artificial eyes have been already produced of this ductile material.

These polymerized alcohols may well be the answer to a "bottle-neck" in the glass-eye problem. It seems that the blowing and colouring of glass eyes was well monopolized and bound up in a cartel system during the interwar period, emanating from Berlin, and that our facilities and capacities for production are now taxed. Already, in Montreal, an energetic technician has produced very acceptable "eyes" made totally of acrylic resin. They are less fragile and more durable than their glass counterparts but present further difficulties of colouring. However, further processes are

under study, to produce acrylic eyes carrying accurate colour incorporations.

Work is already in progress toward a broad testing of these materials in the field of facial prostheses. A dental manufacturer, as a research effort, has already produced an "x-plastic", one of the resins, which has the desirable, rubbery skin texture and is yet durable, keeping its shape and colour. It is hoped to make this, and similar materials, obtainable in several standard skin tints. The material is not yet available commercially, but its extensive clinical trial is being carefully sponsored by the manufacturer in question. With the assistance of the National Research Council and under the auspices of the Department of Oral Surgery at McGill University and the Montreal General Hospital, I have in hand work on these newer plastics which will be reported in due course.

Advances in this field are to be expected from the enthusiasm, ingenuity, and resourcefulness of our American colleagues, working hand in hand with the technical facilities of the motion picture industry. The American armed forces, with an ear cocked to the rehabilitation importance of this type of work, has long since detailed Lieutenant-Commander Gurdin with his assistants, to a full-time consideration of this problem. Their efforts have already produced startling results. The vinylite resins are already in use to produce feather-edge, translucent plastic features readily cemented to the mutilated face by a simple procedure. Matted weaves of life-like looking hair have been made to cover seared bald spots. Commander Gurdin has already dramatically shown the case of an American soldier, wounded in a Pacific engagement, fitted with ear and chin prostheses and adjacent life-like hair, and sent home on leave in a very presentable state, while further surgery and restoration was pending.

REFERENCES

1. HAGEDOORN, A.: Plastic restoration of a deformity caused by complete exenteration of the orbit, *Surg. Gyn. & Obst.*, 1940, 70: 2.
2. BERCOWITSCH, G. G.: Facial restoration, *Dental Cosmos*, 1928, 70: 167.
3. AXT, E. F.: A case of surgical prosthesis, *Dental Cosmos*, 1927, 69: 828.
4. *Idem*: Restoration of an upper lip, *Dental Cosmos*, 1928, 70: 1158.
5. OLINGER, N. A. AND AXT, E. F.: Surgical prosthetics of oral and facial defects, *Am. J. Surg.*, 1936, 31: 24.
6. CLAFLIN, R. S.: Case report of construction of a nose prosthesis, *Am. J. Orthodontics & Oral Surg.*, 1939, 25: 92.
7. GILLIES, SIR H.: Prosthetic appliances as an aid to surgery in facial restorations, *Brit. Dent. J.*, 1935, 59: 361.
8. *Idem*: Die Deformitäten der syphilitischen Sattelnase, *Deutsche Zeit. Chir.*, 1938, 250: 379.

9. KAZANJIAN, V. H., ROWE, A. T. AND YOUNG, H. A.: Prosthesis of the mouth and face, *J. Dent. Res.*, 1932, 12: 651.
10. BULBULIAN, A. H.: An improved technique for prosthetic restoration of facial defects by use of a latex compound, *Proc. Staff Meet., Mayo Clin.*, 1939, 14: 433.
11. *Idem*: Prosthetic reconstruction of nose and ear with a latex compound, *J. Am. M. Ass.*, 1941, 116: 1504.
12. BROWN, A. M.: Correction of facial defects with latex prostheses, *Arch. Otolaryngol.*, 1942, 35: 720.
13. *Idem*: Extensive mutilating facial defect; cosmetic correction with latex mask, *Surgery*, 1942, 12: 957.
14. *Idem*: Latex prosthesis for cosmetic restoration of amputated breast, *South. Surgeon*, 1942, 11: 181.
15. GERRIE, J. W. AND GINWALLA, M. S.: Face masks, *J. Canad. Dent. Ass.*, 1940, p. 67.

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IMMOBILIZATION AND INFREQUENT DRESSINGS IN THE TREATMENT OF WOUNDS AND INFECTIONS*

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FOR many years the surgeons attached to our hospital have adopted the closed plaster method in the treatment of compound fractures and have been so pleased with the results that they were encouraged to apply the same procedure to aid them in the cure of osteomyelitis. During the last few years we have found a variety of conditions in which this method has been used to advantage and the field is slowly but surely enlarging. The types below indicate in some measure the widespread usefulness of the method.

One of the principles on which this treatment is based, namely, rest, is as old as medicine itself. Hippocrates is quoted as stating that "Rest and immobilization are of capital importance in the treatment of wounds". Hilton bequeathed us that never to be forgotten volume on "Rest and Pain" most of which is taken up in emphasizing the value of rest. As early as 1853 Joseph Gamgee, an English surgeon, advised the continued fixation and infrequent dressing of wounds, making use of starched bandages.

During the exigencies of war new methods are investigated that one would hesitate to attempt in ordinary civilian life. The Franco-Prussian war of 1870 was no exception. A French surgeon named Ollier treated 60 cases by enclosing the wound completely in plaster. To him goes the credit of being the first to adopt the closed-plaster method. In 1881 Rutherford Morison, of Newcastle-on-Tyne, strongly advocated large, firm dressings to wounds, not to be changed for a period of three to four weeks. Ogilvie, in 1915, found the closed-plaster

method of treatment in use in the French military hospitals.

In the autumn of 1915 Rutherford Morison published an article upon a specific method of wound treatment. The essential features of his recommendations were excision of the wound, adequate drainage, packing with "Bipp" and immobilization.

During the winter of 1917-1918, Dr. Fraser B. Gurd, now chief of our surgical service, while on a temporary transfer to England from France, at the request of Sir Robert Jones, had a wonderful opportunity to study the treatment of wounds, using the Morison technique. In *The Lancet* of May 25, 1918, he published his results and pointed out the value of infrequent dressings. Many of his cases were treated by the closed-plaster method.

Orr in 1918 substituted vaseline packs for "Bipp" and stressed the importance of immobilization and infrequent dressings. His early work was done on compound fractures, but later he suggested the same form of treatment for osteomyelitis. There is no doubt that he deserves a great amount of credit for popularizing a method which was looked upon in the early days as quite revolutionary.

No one person has had a better opportunity to apply the principles of this form of treatment and to assess its value than has Trueta. During the recent Spanish Civil War he treated over one thousand cases, mostly air-raid casualties. His publication gives the exact details of his technique together with the results, of which he should be justly proud. A series of 1,073 cases with only 6 deaths and 976 satisfactory results demands our admiration when we realize that at the end of the last war, the mortality rate for compound fractures was still 10%. At present he is working in England and has persuaded many of the British surgeons of the merit and usefulness of the method. Rudolph Matas spent two months in Barcelona at the end of 1938 investigating the merits of closed-plaster treatment as carried out by Trueta and his report expresses in very few words its real value.

"There, at the war front, rude experience imposed by necessity seemed to discount the importance of germs, provided the living tissues were allowed to fight their own battle unencumbered by the bodies of dead or dying tissues, and kept undisturbed and protected in the process of repair and reproduction from tempestuous manipulations and destructive germicidal irrigations by absolute fixation in plaster".

The material and experience upon which this paper is based has been taken from the surgical wards of the Montreal General Hospital, where interest in the technique advocated herein has been continuous. A very large number of cases of all kinds have been so treated, including all varieties of fresh trauma, burns, and infections of all kinds, both aerobic and anaerobic.

THE RATIONALE OF CLOSED INFREQUENT DRESSINGS

Although much has been written in explanation of the success of the occlusive dressing from both investigative and clinical experience, there is still no general agreement. We shall list briefly our observations and opinions with such comment as may be available from experience.

Rest.—This fundamental principle of therapy takes precedence over all other factors. It is, moreover, universally understood and accepted. All the other factors will be found to be sub-

* From the Montreal General Hospital, the Surgical Service of Dr. Fraser B. Gurd.

ordinate to rest in one way or another (Hilton).

Prevention or limitation of bacterial contamination.—There is ample confirmation of the exclusion of pathogenic bacteria from wounds by occlusive dressings. This is exemplified by the "closed plaster" treatment and by the "pressure dressings" as used in burn treatment and plastic surgery. The fact that excessive contamination of wounds by pathogens is the price of frequent change of dressing is also well established. In this connection, the work of Hare, Trueta and Barnes, Orr-Ewing, Scott and Gardner is outstanding. It will also be accepted that the saturation of the dressings with

lymphatics rather than via the blood stream. Pawlowsky (1900) was convinced of this, and Drinker *et al.*, have proved it.

Bacteriostasis.—(a) *By autogenous retention within the dressing* of anti-bacterial and other beneficent products of the body's immunological armamentarium in the exuded serum. Very little has been made of this point although its importance may, perhaps, be assumed from the healing in the peritoneal cavity without drainage, or with at best only partial drainage, in a diffuse peritonitis. In any case, it would appear that body defences operate best either early or late when the involved area is immobilized and contamination prevented by an occlusive dressing.

(b) *By chemotherapy.*—Fundamentally and principally, this phenomenon arises from natural immunological sources. Many attempts have been made, however, to aid the local natural defensive mechanism of the body by chemotherapy. Such compounds as "Bipp", "Zipp", "Zisp", the aniline dyes, particularly proflavine, and other materials have all been used, and some with considerable success. More recently sulfonamides have been employed in this rôle. This local use of sulfonamides has been widely developed, and they have been combined with other bacteriostatic agents and placed in various vehicles. At the Montreal General Hospital an oil-in-water emulsion of sulfathiazole was devised in 1941 and has now been used for about two years with gratifying results. This emulsion was designed to give both satisfactory curtain drainage and bacteriostasis. Previous experience with it has already been described in the literature. A brief review of its rationale and the formula will be found elsewhere in this paper.

Curtain drainage.—Whether in fresh trauma or in pre-infected cases, the rôle of packing gauze in the wound in providing adequate drainage is generally accepted. When paraffin or vaseline is impregnated in the gauze, the usefulness of the drain is increased. This latter fact has been emphasized by several writers, notably by Gurd and McKim, who described it as "curtain drainage". More recently, in 1941, the rôle of this type of drainage has been urged by Pfeiffer and Smith.

Adequate surgical treatment.—Finally, it should be stated categorically that in compound fractures and in larger wounds, the failure to



Fig. 1. Case 1.—The progress of bone healing from the second to the fifty-second week, reading from left to right.

moist discharges contributes to their penetrations by contaminating organisms from bedclothes, anus, etc. Consequently the thickness and dryness of dressing or plaster are important.

Effect on local circulation—(a) *vascular*, (b) *lymphatic*.—(a) The localizing effect on infection of "infrequent occlusive dressings" and in particular, "closed plaster", in so far as the vascular circulation is concerned has been described by Trueta as an active congestion of local tissues under the dressing, in many respects simulating the inflammation phenomena. To the authors, the matter seems more easily understood if pressure is regarded as preventing the accumulation of interstitial fluid and thus, we believe, improving the circulation through the affected part. (b) The lymphostatic effect of rest alone has been well demonstrated by Field, White and Drinker. In addition, it should also be recalled that bacterial dissemination from an infection takes place via the

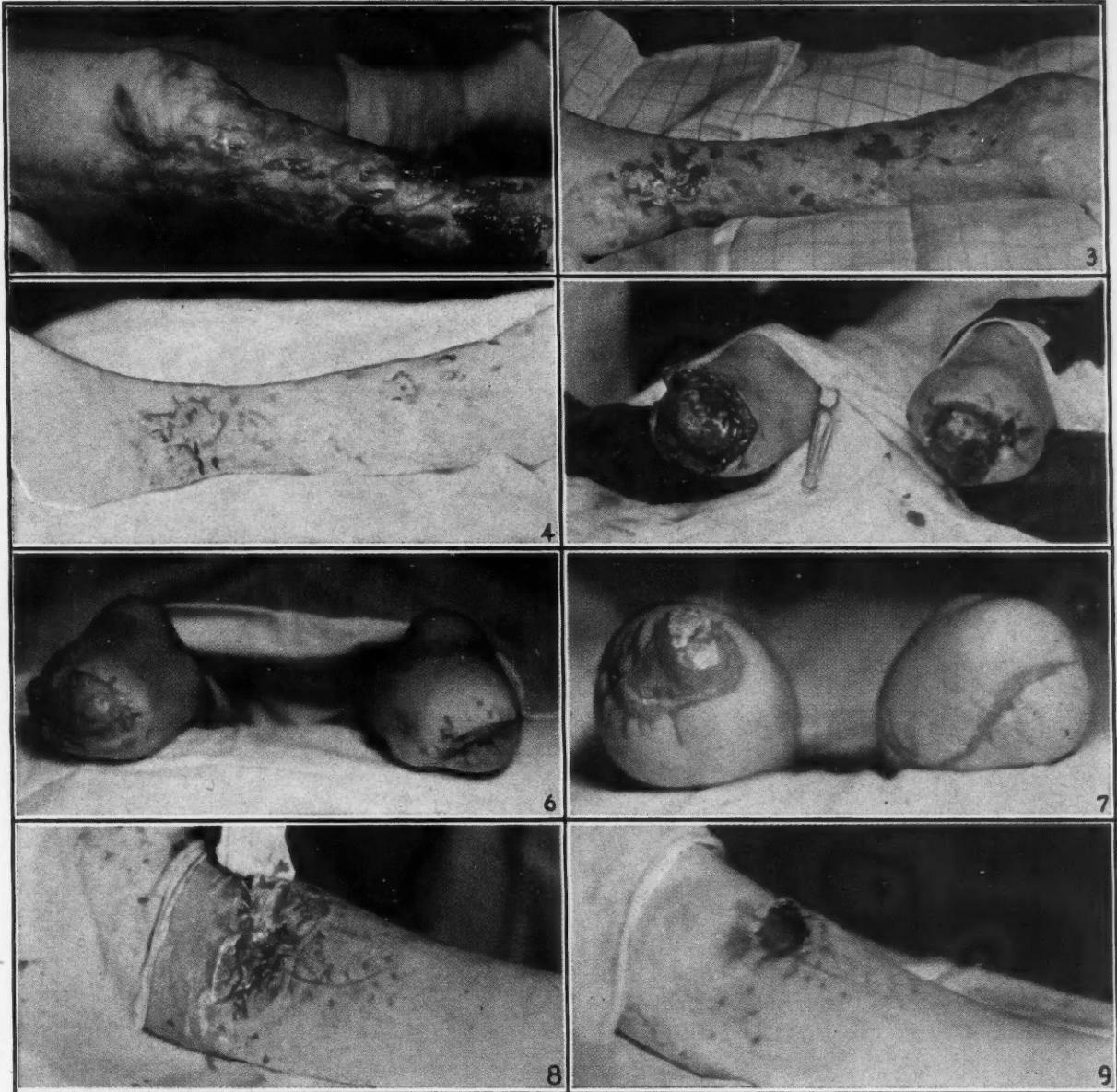
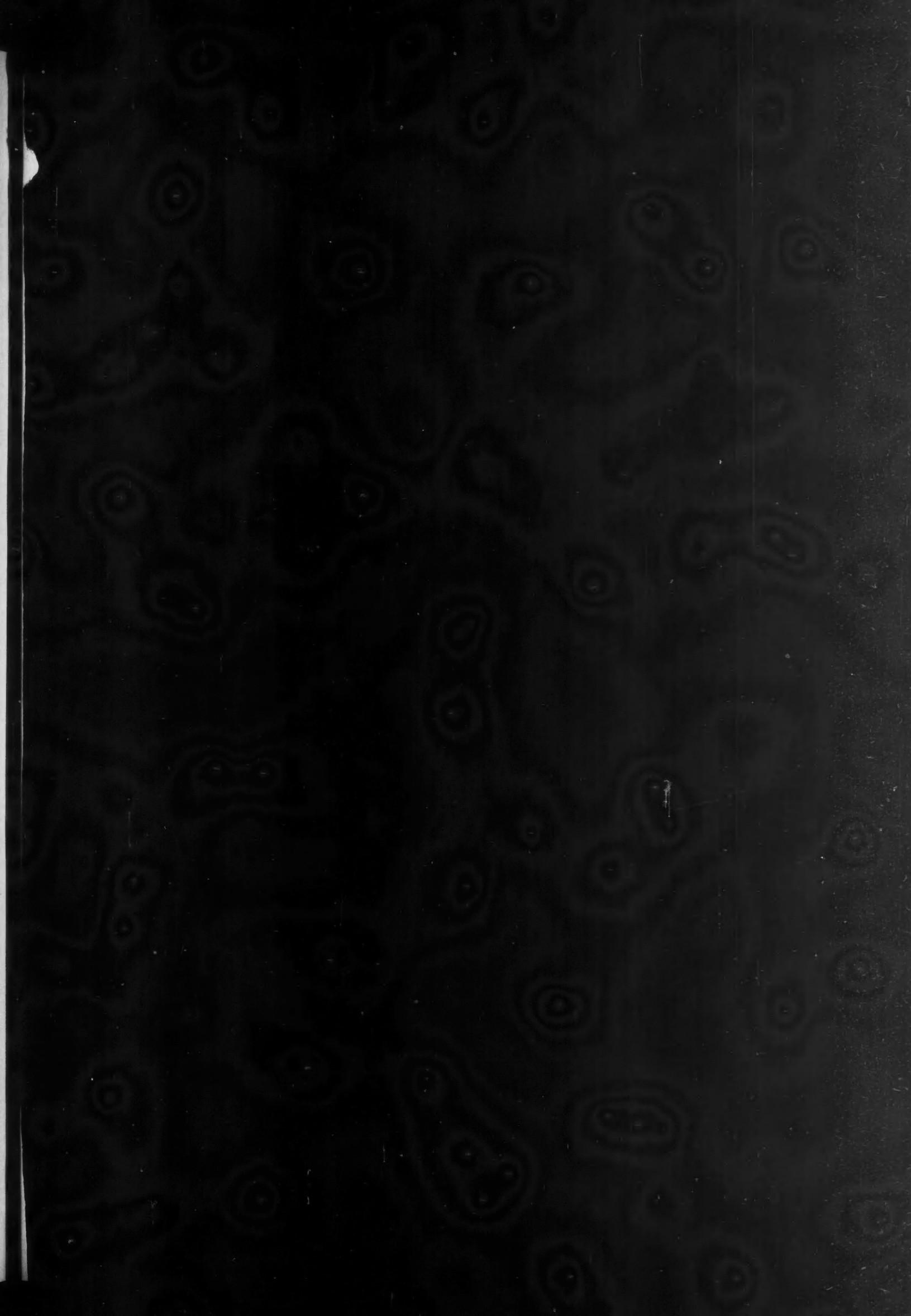


Fig. 2. Case 2.—Shows the leg about two weeks after admission, before application of plaster spica.
Fig. 3.—Shows the extent of healing four months later, after four occlusive pressure dressings, the first two being plaster spicas, and the last two from toes to mid-thigh encased in elastoplast. **Fig. 4.**—Shows the healed grafts just prior to discharge. The "take" was 100%. **Fig. 5.** Case 4.—Shows the stumps on removal of the first dressings three weeks after amputation. At this dressing, the left stump was secondarily sutured and the right covered with a split skin graft. **Fig. 6.**—After removal of the second dressing three weeks later. **Fig. 7.**—Two months after Fig. 6 just prior to excision and re-amputation of grafted stump. This procedure could have been carried out a month earlier, but the boy was left at the Convalescent Home in the country for the extra time. **Fig. 8.** Case 5.—Shows the wound at six weeks, partially closed at original operation, and with freshly inserted sulfathiazole emulsion pack in open position. **Fig. 9.**—Shows pack removed at nine weeks. This wound was then secondarily sutured.







carry out adequate surgical excision of dead and devitalized tissue, to enlarge the wound, and to relieve fascial tension nullifies all of the foregoing benefits of occlusive infrequent dressings. We believe that in civil practice, as well as under field service conditions, this statement still holds, notwithstanding W. H. Ogilvie's report on the Dunkerque casualties, and the very excellent recent report on the South Sea casualties by Ferguson *et al.* These two reports have indicated that only minimal wound excision or débridement is necessary. We feel, however, that both of the reports are based upon casualties occurring under special conditions, i.e., the beaches, sea warfare, or land not long contaminated by dense human or animal population. Injuries occurring in more densely populated areas, such as Europe, Asia or America will inevitably be more subject to bacterial contamination and will demand wound excision.

BACTERIOLOGICAL COMMENT

Considerable investigation has been carried out to determine if the bacterial flora is reduced in the closed-plaster method of treatment. Unfortunately, that is not so. Trueta found after repeated bacteriological examinations at the surface of the wound and also of the secretions that saturate the plaster, a great abundance and variety of organisms, even in those cases that are most free from clinical symptoms of infection. It is quite evident that organisms thus found, such as streptococci, staphylococci, *B. welchii*, etc., usually regarded as markedly pathogenic, may exist and even flourish without invading the tissues to a degree causing clinical infection.

Orr-Ewing, Scott and Gardner made some very interesting and instructive observations. They believe that the flora of these plaster-treated wounds does not appear to differ from that found in open wounds of similar type. Haemolytic streptococcus and *Staph. aureus* found in early cases invariably persisted in the wound to the end of the plaster treatment. They were satisfied that in normal circumstances no infection of the wound takes place through the plaster casing. A very ingenious window was devised through which cultures were taken. A most important observation was made after the first change of plaster. Species of organisms new to the wound were discovered, suggesting that contamination resulted from the change. This would explain the usual slight increase of temperature found after a new cast is applied.

It has been stated many times, without much proof, that the presence of *pyocyaneus* inhibited the growth of pyogenic organisms in some way. In many cultures haemolytic strep-

tococcus, *Staph. aureus*, and *pyocyaneus* were found living peacefully together, which rather refutes this argument. Many of the bacteria are carried into the tissues from the surrounding skin and foreign bodies introduced by the agents producing the trauma, but without doubt a great many result from careless handling at the dressing periods. Pulaski and Meleny found bacteria in as much as 66% of recent traumatic wounds, emphasizing the importance of excision of the wound in early cases. There is great necessity for distinguishing between a wound which is only contaminated and an infected one. How to differentiate one from the other however, is extremely difficult, if not impossible, except on clear clinical evidence.

It has been proved that almost 100% of accidental wounds are contaminated. Bacteria are carried into the wound by the inflicting agent and thrive on dead tissue or tissue juices. It is during this stage that excision of the wound has proved so valuable. A large proportion of the invading organisms are removed with the excised tissue and foreign bodies. After a certain period of time, as yet undetermined, the bacteria may invade the tissues of the host, and the wound is considered infected. An arbitrary time of six to eight hours is used to separate these stages, without much evidence or proof. It is during this pre-infected stage that excision has been considered to be of greatest value prophylactically.

Evidence is accumulating to prove that there is no definite "safe period" or time-limit for wound excision. It is important to recall however that all contaminated wounds do not necessarily become infected, moreover the virulence of the organisms and the resistance of the body tissues are only part of the story. Adequate surgery and wound drainage are more important factors.

STEP BY STEP HOSPITAL PROCEDURE

The preliminary steps in fresh traumatic wounds will not be dwelt on, beyond emphasizing the necessity for anti-shock and anti-haemorrhage measures. The preparation for operative procedures requires careful choice of sedation. The inhalation type of anaesthesia is indicated, rather than the spinal.

Surgical excision of the wound.—(a) Enlargement of the wound is the first step and is essential for adequate exploration, successful ex-

cision and extraction of foreign bodies. The wound edges are conservatively excised at this time. The deep fascia is now widely incised, lest eventual tension of tissues favour interference with the blood supply and predispose to gangrene. This is a detail of fundamental importance. (b) Blood vessels are now inspected and all gross haemorrhage arrested. Should arterial suture or the use of a vitallium tube be indicated, this is postponed until the wound excision is completed. This applies also to suture of nerve, tendon or other structure. (c) Excision of all dead and badly traumatized tissue in the depths of the wound. This procedure is radical, the whole area being removed if possible *en masse*. Conservatism has no place here. (d) Amputation—Should amputation be necessary the stump is packed open, only sufficient loose suturing of the edges being done to retain the pack.

Fracture treatment.—Reduction and fixation of the fractures is now done, and where necessary, internal or external mechanical fixation carried out.

Wound (curtain) drainage.—From the depths outward the interstices of the wound are now snugly packed with gauze impregnated with 5% sulfathiazole emulsion.* The emulsion is used liberally and in excess, rather than conservatively. Alternatively "Bipp" paraffin gauze technique is done. Although not always carried out by the authors, this packing may be preceded by the instillation of a 5 to 10% suspension of sulfathiazole crystals or microcrystals. This is carried out in such a manner as to leave a frosting of the crystals in the depths of the wound, and on the surface, after all excess suspension has been spilled or mopped up. This variation in technique we owe to a personal communication from Dr. Wm. V. Cone, of the Montreal Neurological Institute, who developed it while serving in the No. 1 Canadian Neurological Unit in Britain.

Surface dressing.—The excess of the packing covers the wound with a thin layer of gauze. This in turn is covered with gauze dressings impregnated with the emulsion. Finally, dry fluffed gauze and cotton waste are used as a reinforcement or padding for the whole area, and in sufficient quantity to make the largest

feasible elastic compressible dressing, at least 3 to 4 inches in thickness.

Occlusive dressing.—Plaster of Paris elasto-plast bandages, or other alternatives are now used to encase the limb or part in such a way as to produce maximum fixation. Not only the wound area but the joints proximal and distal to the wound must be encased. This reduces muscular action to an absolute minimum and consequently promotes lymph stasis. The plaster may be applied as snug moulds or slabs reinforced and fixed by circular plaster bandages, or the latter may be used throughout. In any event, the encasing plaster or bandages must be applied with moderate pressure. The skill with which this is done allows for sufficient sustained pressure to prevent early loosening, although not sufficient pressure to embarrass the vascular circulation. Such skill will only be acquired by personal experience. It should be pointed out here that when starch crinoline bandages are used allowance is made for shrinkage and tightening as the bandage dries. This may appear to vary widely from the unpadded plaster technique. Actually, however, the difference is more apparent than real, for the *large elastic* dressing under the plaster has essentially the same effect and is, we believe, a safer method for general use. It is noteworthy that Trueta now advocates padding.

Drying of the plaster or starch bandage is accelerated by the use of a baker.

Elevation.—It is well to allow elevation of the part at least till drying is complete and the circulation well established. During this period frequent inspection of the circulation of the protruding toes or fingers is necessary.

WOUNDS WITH PRE-EXISTING INFECTION

Incisions must be so placed that maximum effect upon interstitial tension may be obtained with minimal damage to essential structures. They must be adequate in size for good drainage purposes. Where necessary Hilton's method of blunt dissection of deeper tissues is employed. As a general rule multiple incisions should be avoided; rather one or a few more extensive openings should be so fashioned that the effect indicated above may be obtained.

All pocketing is broken down, and in carbuncular types of inflammation, the edges of the lesion are undercut to the limit of induration. In every case the guiding rule is to incise suf-

* Emulsion sulfathiazole 5% (M.G.H. Formula): sulfathiazole, 5%; triethanolamine, 2%; distilled water, 24%; white beeswax, 5%; liquid paraffin, 64%.

ficiently not only on the surface for good drainage, but, more importantly, to incise the fascial planes so as to both relieve all existing tension and anticipate its possible development or recurrence. Cultures are taken at once. As much necrotic tissue and debris as can be judiciously excised is removed and the purulent contents of the abscess well evacuated. Allowance being made for good drainage, a gauze pack soaked in 5% sulfathiazole emulsion is now placed snugly in the cavity and the ends used to thinly cover the wound. The rest of the dressing procedure is carried out exactly as for fresh trauma wounds.

Dressings are changed with about the same frequency in these cases as in fresh wounds. This may depend somewhat upon the amount of primary haemorrhage, necrosis or exudate, but the weekly timing has for all practical purposes proved satisfactory. This practice is carried out with both indoor and outdoor patients. In many cases, however, as in drained osteomyelitis, it has been found advantageous to leave the cast or dressings on much longer, up to six weeks. So far we have not had cause to regret these longer intervals in a single instance, though the odour may at times become objectionable.* The possibility of delay or impairment of function should always be kept in mind after three to four weeks in a fixed position, particularly if for any reason an unphysiological position has been necessary.

WOUND SUTURING

Primary suture is only done on our early superficial wounds, within the first six hours, called "golden hours" by W. W. Keen, when the risk of infection is minimal, though contamination be always present. This decision also will depend upon the anatomical site of the wound and again upon its nature. Among the cases thus chosen for primary suture in the "golden hours" are minor lacerations in general; wounds involving joints; wounds of the hands and feet with tendon divulsions; chest wounds; wounds with vessel or nerve severance; wounds of the head, face and neck where the circulation is particularly good and infection uncommon. The last group must also be considered from the point of view of possible disfigurement which may occur if healing is in-

adequate. The reader is referred to W. H. Ogilvie's report on 5,000 cases of primary suture, in which only 50% showed good primary healing without infection. Most of these cases, it should also be noted were very carefully selected.

Primary delayed suture is done in most other traumatic treatment cases usually after the packing treatment has been done for one or two weeks, that is at the time of first or second dressing. Up to this time as a rule wounds may be sutured without difficulty and usually without further excision or freshening, as granulation is not excessive.

Secondary suture implies a freshening or excision of the wound edges and is done for all cases in which delay is longer than two weeks, as when infection has been present. This practice is followed even in carbuncles.

In all deep wounds, especially of the extremities, buttocks, etc., and involving muscle, primary suture is not practised, regardless of the so-called "golden hours", and regardless of whether bacteriostatics have been used at the first dressing or not.

Skin grafting of all types should also be, to all intents and purposes, considered as primary, delayed primary, or secondary.

SIX ESSENTIAL FEATURES FOR THE SUCCESS OF THIS TECHNIQUE

Experience by all those familiar with this method of surgical treatment has shown that the degree of success obtained depends upon certain essential factors, notably:

1. *Timing of each step in procedure.*—All other factors are subordinate to this from the first to last. For example, the unwise attempt of attempting surgical operation in fresh trauma before shock and haemorrhage is controlled should be emphasized. On the other hand if operation be delayed too long the risk of infection is enhanced. Hence the "golden hours" or "safe period" are the essence of "timing". An illustration of this is the success of relatively early skin grafting in burns, in the third or fourth week before granulation becomes excessive and the patient's general condition deteriorates.

2. *Efficient first-aid in emergency cases.*—(a) Control of haemorrhage. When a tourniquet is required it is imperative that it be inspected by a doctor within half an hour. See Blalock's recent publication for elaboration. (b) Prevention of contamination by early application of a large sterile gauze dry dressing. This dressing should rarely be interfered with until the case has reached the surgeon who is prepared to treat it. Application of a sulphonamide in powder or suspension form may be carried out to advantage before the dressing is applied. (c) Minimization of shock by alleviation of pain, protection from the elements and gentleness in handling the patient. (d) Splinting of cases where necessary with due regard to the nature of the injury and due respect for the circulation of the part.

* Methods of combating this with "bag" or vacuum apparatus have been developed.

3. Control of shock and haemorrhage.—In so far as it is possible before definitive surgical treatment is begun.

4. Adequate surgery adapted to the individual case.—(a) In fresh trauma this means enlargement, exploration, and thorough wound excision. Evidence exists that when this is done within six hours of injury there is minimal risk of wound infection. Under special circumstances a period considerably longer than six hours may safely intervene between receipt of wound and operative care. Such conditions may include among others, wound received on shipboard, on clean sandy beaches and in manufacturing plants where infective material is absent. Early adequate application of sulfonamides, or perhaps their oral administration, prolongs the "safe period" substantially, we believe. (b) In all cases including infections this treatment implies provision for adequate wound drainage by the insertion of a snug pack of paraffin-impregnated gauze. There is ample evidence to show that when the pack is impregnated with an oily material such as liquid paraffin or vaseline, the drainage effect becomes more efficient.

5. Immobilization of the part.—By plaster of Paris, starch bandages, pressure dressings, etc. In our experience it does not matter that "closed plaster" dressings be unpadded with this technique. On the contrary we have found that a bulky dressing or padding under the plaster may be advantageous, providing the latter is applied with moderate pressure and especially if the bulky dressing is made semi-elastic as by cotton waste. This dressing absorbs considerable exudate and continuous pressure is maintained throughout.

6. Timing of dressing change.—The timing of change of dressing is most important. It will depend upon a number of things. Fundamentally it should be as infrequent as possible or necessary. In explanation of this statement one must consider all the reasons for the ordinary change of dressing. They may be listed as follows: (a) Because of healing that has already taken place—as in superficial burns in six or seven days. (b) Because healing has taken place and prolongation of fixation may cause delay of functional recovery as in tendon sutures. (c) Because prolonged fixation is conducive to healing as in fractures (Case A2). (d) Because exudate or haemorrhage is excessive and wound toilet is indicated as in large trauma. (e) Because bacteriostasis is exhausted by excessive slough, necrosis or exudate and renewal of the bacteriostatic agent required, as in large infected areas or abscesses. The inhibitory effect of necrotic tissue and exudate on the bacteriostatic action of sulfonamides has been emphasized by such workers as Holderand, MacKay and Strakosch and Clark. These workers have demonstrated that when urea (carbamid) is added to the sulfonamides, it effects some increase in the rate of necrosis or sloughing time. This in turn prolongs the bacteriostatic effectiveness of the sulfonamide. Urea would thus appear to be a useful adjunct in extensive sloughing wounds. It must however be recalled that it does inhibit epithelialization, and also causes overgrowth of granulation tissue. Therefore its use should be discontinued once the slough has separated. We have had no personal experience with the use of urea in our dressings.

Re-dressing—in the normal course of events.—When one surveys the reasons for ordinary re-dressing it becomes apparent that the "timing" will vary somewhat with different types of cases, and even with different cases of the same type. The experienced surgeon will therefore make his own decision in the individual case. The "end point" of the individual dressing has been a consideration of prime importance in this work. In each case all of the above mentioned clinical factors are

taken into consideration before reaching a decision. In addition when splinting is not essential, the authors have been influenced by the tissue concentrations of sulfathiazole, and by the results of daily bacterial counts on the exudate to change the bacteriostatic medium at approximately weekly intervals. It may be of interest to add that this same weekly procedure is carried out on out-patients as well as in-patients.

EMERGENT INDICATIONS TO REMOVE CAST

Temperature.—A slight temporary rise of temperature is not an indication to remove or split the cast. In some cases after a change of cast there is temporary increase of temperature which falls to normal in a few days. It is probably due to some extra absorption as a result of handling, or very occasionally to slight fresh infection. Occasionally a continuous increase of temperature results from imperfect immobilization. These temperatures are only transient and unimportant. *Persistent increased temperature* must be associated with some other symptom before one is justified in removing the cast.

Pain.—Continuous throbbing pain, especially if associated with an increased temperature demands investigation. In every single instance persistent pain and fever will be traced to failure of the human factor in either diagnosis or surgical technique, and not to the principle of occlusive dressing.

Oedema.—Oedema of the portion of the extremity beyond the plaster, which persists after elevation of the limb, suggests circulatory trouble. This complication has fortunately been seen very rarely in our cases; apart from the human factor, it may represent secondary haemorrhage or other unforeseen vascular incident.

Loosening of cast.—This complication may result from atrophy of the muscles or inadequate improper padding. As one of the main essentials of the treatment, namely, immobilization, is lost, the cast must be replaced. Inadequate immobilization such as failure to incorporate nearby joints, may cause any or all of the above mentioned conditions. *This point needs all possible emphasis.*

Time-limit.—There is no such thing as a time-limit in this treatment. Without complications arising, casts have been retained for as long as

three months. The average time for a change of cast is about 3 to 4 weeks.

Odour.—Offensive odour may occur especially in lower extremity cases. Unless these cases are segregated the other patients in the ward may object strenuously to the odour and force one to change the cast earlier than one anticipated, or to move the patient. Many deodorant devices have been used to obviate this objectionable feature of the treatment. A two-layered stockinette "sheath" filled with charcoal and drawn over the plaster has proved satisfactory. Professor Seddon's device of a cloth with absorbent substance incorporated (on a gas-mask filter principle) which is stitched over the plaster has proved quite popular.

ADVANTAGES

Comfort of patient.—This is one of the advantages which is beyond argument. The majority of our patients complained of no pain following complete immobilization. In the cases which have been treated by other methods and changed to plaster, the improvement in the patient's mental attitude was a pleasure to behold. In large traumatic wounds or infections it is almost impossible to change dressings without pain. With the closed plaster method the changes are so infrequent that when necessary one can use a general anaesthetic without very much harm to the patient.

Saving of material and time of staff.—In times like the present with a markedly reduced staff and materials difficult or impossible to obtain, this feature is extremely valuable.

Limitation of infection.—There is no doubt that with frequent dressings bacteria new to the wound are introduced at each change. Many cases now are not dressed for 3 to 8 weeks. With these occlusive dressings, new or cross-infection becomes possible only at such infrequent intervals and with negligible results. It has been proved experimentally that under conditions of complete immobilization the tissues of the body are capable of resisting many different types of bacteria. It provides the optimal conditions for the body itself to destroy the invaders. There is a strong probability that the majority of bacteria in a localized infection are absorbed into the general circulation by way of the lymphatics. Immobilization of a limb reduces to an almost infinitesimal quantity the flow of lymph. The rate and

amount of lymph are both increased by movement of the limb, as shown by Field, White and Drinker in 1933.

Hastens healing.—In older wounds, granulation tissue acts as a barrier between infected and healthy tissue. It was demonstrated by Halley, Chesney and Dresel in 1927 that this barrier was impermeable to many different varieties of bacteria, provided the granulation tissue presented an unbroken surface. Frequent dressing damages the capillaries, breaks down this barrier and allows the infection to spread.

TYPES OF CASES IN WHICH THE TREATMENT HAS BEEN EMPLOYED

A. *Fresh traumatic cases potentially contaminated.*—(1) Compound fractures and fracture dislocations; (2) Amputations and re-amputations; (3) Crush injuries of extremities; (4) Divulsions of tendons, nerves; (5) Extensive lacerations and avulsions; (6) Burns, grafting operations and donor sites.

B. *Pre-existing infections.*—(1) Osteomyelitis (a) without drainage, (b) with drainage; (2) Large soft tissue abscesses of extremities; (3) Infections of extremities, such as thenar and palmar abscesses; (4) Acute or chronic ulcers of all types.

ILLUSTRATIVE CASES

CASE 1

L.M., a boy, aged 9. Admitted to Children's Memorial Hospital, January 22, 1942, with a history of pain in the right hip with a high temperature. There was marked tenderness over the upper end of the femur with some swelling and a temperature of 100° F. The pulse was 120, the white cell count 6,600. Sulphathiazole was given for only one day and then discontinued. X-ray taken at this time revealed necrosis of practically two-thirds of the shaft of the femur. As there was no sign of any local abscess or sinus and in view of the widespread character of the infection it was decided to determine what effect complete immobilization would have. A plaster spica was applied from the lower ribs to the toes. The temperature immediately dropped to normal, the pain disappeared and the child's general condition improved remarkably. No operation was performed. The boy is now running around and the femur is almost completely regenerated as seen by the x-rays (Fig. 1).

This case proves that bone sequestra may be absorbed without the formation of a sinus. It also demonstrates the valuable rôle complete immobilization plays in the treatment of acute infections.

CASE 2

Mrs. J.B., aged 70. Admitted to the Montreal General Hospital on September 21, 1942, as the result of an intertrochanteric fracture of the right femur. Her main interest to us was that the skin of the right lower leg from the patella to the base of the toes was completely replaced by scar tissue or ulcers. The ulcers which were many, varied in size and shape, two of the larger being about 4 to 5 inches in diameter. They were situated both on the anterior and posterior surface. The history revealed that the ulceration had been present for the last eight years. The blood Wassermann test was positive. We considered that in this patient we had discovered a case that would be a real test of the value of the closed-plaster treatment. In order to give it full marks we withheld the anti-luetic treatment until the ulcers were completely healed.

The leg was completely immobilized in a plaster of Paris spica which extended down the right leg to the base of the toes and down the left leg to the knee. On November 9, 1942, this was changed to an elastoplast dressing. These were changed every four weeks. On February 4, 1943, the ulcers were sufficiently clean to permit of grafting. On March 9 the patient was discharged with all the ulcers healed (Figs. 2, 3 and 4).

CASE 3

A.S., female, aged 13 years, was admitted *in extremis* three weeks after a minor superficial infection in the right leg, with all evidences of acute septicemia and osteomyelitis in the proximal end of the left humerus. She was comatose and her condition was considered very grave. Operation was carried out shortly after admission and the periosteum over the upper end of humerus found to be elevated by the pus. The shaft was drilled and similar pus obtained. The wound was treated by the prescribed technique and a plaster shoulder cap applied including the forearm but not the hand. The first re-dressing was done at three weeks and x-ray showed extensive involvement of the humeral shaft but a normal shoulder joint. Subsequent dressings were carried out at monthly intervals for four months, when on x-ray examination, two sequestra were found and removed at operation. Local occlusive dressings with elastoplast have been entirely satisfactory and now, six months after the original admission, there is only a small draining sinus at the site of the original incision and function of the arm is being restored. There has been no disease of the shoulder or elsewhere in the body to date.

CASE 4

This patient, a boy of 12, was admitted with traumatic amputation of both legs below the knee. Severe haemorrhage had occurred and he was brought in with no dressings on the wounds. After being given 1,500 c.c. of fresh blood he was ready in about six hours for operation. Twin guillotine amputations below the tibial tuberosities on each side were performed.

The stumps were packed with sulfathiazole emulsion gauze and the flaps loosely approximated. Plaster enclosed pressure dressing was then applied as a turn spica. He received further transfusions, but the crush syndrome developed with the usual oliguria and the boy for three days was *in extremis*. He rallied on the fourth day and then recovered quickly, in spite of a secondary haemorrhage of the liver with a hematoma.

Dressings were removed under anaesthesia in three weeks. The stumps were clean and temporary grafts were applied where the flaps did not cover the granulating area. Occlusive plaster dressings were again applied and in three weeks were removed, small dry dressings then being sufficient.

Normal knee function was obtained in both legs, allowing for artificial limbs. (See Figs. 5, 6 and 7.)

CASE 5

Severe compound fractures—both bones of the left forearm. Admitted within one hour of the accident. Circulation and nerve function were intact. Shock and haemorrhage were shortly controlled, allowing operation to be carried out within two hours of admission. The wound required considerable muscle debridement. Reduction of the fractures were retained without mechanical fixation, because the sharp ends of the bones caught. After packing gauze impregnated with sulfathiazole emulsion, a padded plaster of Paris encasement was applied, including arm, forearm and hand. Postoperative course was uneventful. The first change of dressing was done at six weeks (Fig. 1). Roentgenograms showed no evident bone disease.

At two months (Fig. 2), the wound was completely sutured but continued arm fixation in plaster was necessary as bony union was incomplete. At three months, function has been commenced without occlusive dressing.

This is the condition at the present time. There is no nerve partial paralysis, but muscular weakness is still marked and requires physiotherapy. (See Figs. 8 and 9.)

An extensive bibliography has been prepared and will appear in the reprints.

Grateful acknowledgment is made to Messrs. C. E. Frosst & Company, and Messrs. Johnson & Johnson, for supplies furnished in the treatment of these and several other cases.

THE SULFONAMIDE TREATMENT OF WOUNDS*

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EXPERIMENTAL work has shown that in animals inoculated with streptococci or with organisms of gas gangrene the incidence of fatal infections can be greatly reduced by immediate treatment of the infected wound with one or other of the sulfonamide drugs, whereas a delay of even a few hours in instituting such treatment leads to a high mortality rate.^{1 to 6} As there is also clinical evidence of the value of the sulfonamides in the early treatment of infected tissues, it has been advocated that every soldier in the war zones should carry on his person a supply of sulfathiazole or sulfanilamide for the first-aid treatment of wounds. This is desirable as, to be effective, the drug must be applied to the wound before necrosis or suppuration has led to the accumulation of sulfonamide-inhibiting substances at the injured site. Such first-aid treatment should be followed by excision of devitalized tissue and re-application of the drug at the earliest possible moment.

While early sulfonamide treatment of wounds is good practice, neither sulfonamide powders nor thick sulfonamide-containing emulsions or pastes are entirely satisfactory for this purpose, as in the case of deep or jagged lesions it is impossible to secure their even distribution throughout the lacerated tissues. It would seem that what is needed is a sulfonamide preparation with physical properties which facilitate its spread throughout a wound, and which tend to the production and maintenance of a high concentration of the drug in the bordering tissues.

With these considerations in mind, and having

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TABLE I.

BLOOD SULFATHIAZOLE CONCENTRATIONS (MG.M. PER 100 C.C.) AT INTERVALS AFTER THE INSERTION OF EQUIVALENT AMOUNTS OF VARIOUS PREPARATIONS OF SULFATHIAZOLE (200 MG.M.) INTO THIGH MUSCLES OF GUINEA PIGS

<i>Material</i>		<i>Hours after injection</i>				
		$\frac{1}{2}$	2	6	24	48
I. Sulfathiazole powder (S.).....	Number of estimations	24	22	12	12	11
	Mean.....	1.31	1.62	2.13	2.11	1.28
	Standard deviation....	0.787	0.458	0.501	0.554	0.315
II. Sulfathiazole in saline solution (S.S.).....	Number of estimations	16	16	13	13	7
	Mean.....	2.04	2.91	2.95	2.45	1.42
	Standard deviation....	0.813	0.955	0.942	0.714	0.741
III. Sulfathiazole in oil (S.O.).....	Number of estimations	21	21	18	15	14
	Mean.....	2.58	3.94	4.50	3.40	1.54
	Standard deviation....	0.938	1.31	1.27	1.19	0.293
IV. Sulfathiazole in emulsion of oil-in-water type (S.E.)	Number of estimations	15	15	15	13	7
	Mean.....	3.93	4.62	4.10	2.10	0.92
	Standard deviation....	0.834	1.16	0.802	1.11	0.294
V. Very finely ground sulfathiazole in oil "colloidal sulfathiazole" (C.S.).....	Number of estimations	22	24	21	17	13
	Mean.....	3.12	4.55	5.16	3.40	1.67
	Standard deviation....	1.08	1.53	1.71	0.972	0.607
VI. Very finely ground sulfathiazole ("colloidal sulfathiazole") in emulsion of oil-in-water type (C.S.E.)	Number of estimations	18	18	17	14	
	Mean.....	5.15	5.44	4.56	2.38	
	Standard deviation....	0.728	1.06	0.784	0.614	
VII. Sulfathiazole in oil (III) plus 0.15% aerosol (S.O.A.).....	Number of estimations	24	24	23	20	10
	Mean.....	3.57	4.81	5.64	2.76	0.98
	Standard deviation....	1.07	1.44	1.37	0.625	0.297
VIII. "Colloidal sulfathiazole" (V) plus 0.15% aerosol (C.S.A.).....	Number of estimations	25	25	23	22	14
	Mean.....	3.67	5.28	4.93	2.79	1.87
	Standard deviation....	0.967	1.44	1.25	0.943	0.536

TABLE II.

COMPARISON OF MEAN BLOOD SULFATHIAZOLE CONCENTRATIONS (MG.M. PER 100 C.C.) AFTER INSERTION OF EQUIVALENT AMOUNTS OF VARIOUS PREPARATIONS OF SULFATHIAZOLE (200 MG.M.) INTO THIGH MUSCLES OF GUINEA PIGS, SHOWING INFLUENCE OF THE VEHICLE UPON RATE OF ABSORPTION OF THE DRUG.

<i>Material</i>		<i>Hours after injection</i>				
		$\frac{1}{2}$	2	6	24	48
Sulfathiazole in saline-solution (S.S.).....		2.04	2.91	2.95	2.45	1.42
Sulfathiazole powder (S.).....		1.31	1.62	2.13	2.11	1.28
Difference.....		+0.73*	+1.29*	+0.82*	+0.34	+0.14
Standard error.....		0.26	0.26	0.30	0.25	0.30
Sulfathiazole in oil (S.O.).....		2.58	3.94	4.50	3.40	1.54
Sulfathiazole powder (S.).....		1.31	1.62	2.13	2.11	1.28
Difference.....		+1.27*	+2.32*	+2.37*	+1.29*	+0.26*
Standard error.....		0.26	0.30	0.33	0.34	0.12
Sulfathiazole in emulsion of oil-in-water type (S.E.).....		3.93	4.62	4.10	2.10	0.92
Sulfathiazole powder (S.).....		1.31	1.62	2.13	2.11	1.28
Difference.....		+2.62*	+3.00*	+1.97*	-0.01	-0.36*
Standard error.....		0.27	0.31	0.25	0.35	0.15
Sulfathiazole in emulsion of oil-in-water type (S.E.).....		3.93	4.62	4.10	2.10	0.92
Sulfathiazole in oil (S.O.).....		2.58	3.94	4.50	3.40	1.54
Difference.....		+1.35*	+0.68	-0.40	-1.30*	-0.62*
Standard error.....		0.30	0.41	0.37	0.44	0.14

*These differences which are greater than twice their standard errors may be presumed to have significance.

TABLE III.

COMPARISON OF MEAN BLOOD SULFATHIAZOLE CONCENTRATIONS (MG.M. PER 100 C.C.) AFTER INSERTION OF EQUIVALENT AMOUNTS OF VARIOUS PREPARATIONS OF SULFATHIAZOLE (200 MG.M.) INTO THIGH MUSCLES OF GUINEA PIGS, SHOWING INFLUENCE OF PARTICLE SIZE UPON RATE OF ABSORPTION OF THE DRUG.

Material	Hours after injection				
	1/2	2	6	24	48
Very finely ground sulfathiazole in oil ("colloidal sulfathiazole") (C.S.)	3.12	4.55	5.16	3.40	1.67
Sulfathiazole in oil (S.O.)	2.58	3.94	4.50	3.40	1.54
Difference	+0.54	+0.61	+0.66	0.00	+0.13
Standard error	0.31	0.42	0.48	0.39	0.19
Very finely ground sulfathiazole in emulsion of oil-in-water type (C.S.E.)	5.15	5.44	4.56	2.38	
Sulfathiazole in emulsion of oil-in-water type (S.E.)	3.93	4.62	4.10	2.10	
Difference	+1.22*	+0.82*	+0.46	+0.28	
Standard error	0.28	0.39	0.28	0.35	

*These differences which are greater than twice their standard errors, may be presumed to have significance.

TABLE IV.

COMPARISON OF MEAN BLOOD SULFATHIAZOLE CONCENTRATIONS (MG.M. PER 100 C.C.) AFTER INSERTION OF EQUIVALENT AMOUNTS OF VARIOUS PREPARATIONS OF SULFATHIAZOLE (200 MG.M.) INTO THIGH MUSCLES OF GUINEA PIGS, SHOWING INFLUENCE OF AEROSOL UPON RATE OF ABSORPTION OF DRUG.

Material	Hours after injection				
	1/2	2	6	24	48
Sulfathiazole in oil with 0.15% aerosol (S.O.A.)	3.57	4.81	5.64	2.76	0.98
Sulfathiazole in oil (S.O.)	2.58	3.94	4.50	3.40	1.54
Difference	+0.99*	+0.87*	+1.14*	-0.64	-0.56*
Standard error	0.30	0.42	0.42	0.34	0.12
"Colloidal sulfathiazole" with 0.15% aerosol (C.S.A.)	3.67	5.28	4.93	2.7	1.87
"Colloidal sulfathiazole" (C.S.)	3.12	4.55	5.16	3.40	1.67
Difference	+0.55	+0.73	-0.23	-0.61	+0.20
Standard error	0.30	0.43	0.46	0.31	0.22

*These differences which are greater than twice their standard errors, may be presumed to have significance.

TABLE V.

MORTALITY RATES IN GUINEA PIGS WITH EXPERIMENTAL WOUNDS INOCULATED WITH *Cl. Welchii*

Therapeutic agent	Sulfathiazole dose	Delay in treatment	Number	Percentage mortality	
				3rd day	7th day
None.....	.....	....	25	96	96
Sulfathiazole powder.....	50 mgm.	0	25	40	44
"Colloidal sulfathiazole" 1/2 c.c.....	50 mgm.	0	25	40	40
"Colloidal sulfathiazole" with aerosol 1/2 c.c.....	50 mgm.	0	25	44	44
Sulfathiazole powder.....	50 mgm.	2 1/2 hours	25	48	48
"Colloidal sulfathiazole" with aerosol 1/2 c.c.....	50 mgm.	2 1/2 hours	25	44	44
Sulfathiazole powder.....	100 mgm.	2 1/2 hours	50	10	16
"Colloidal sulfathiazole" with aerosol 1 cc.....	100 mgm.	2 1/2 hours	50	20	22
Sulfathiazole powder.....	100 mgm.	5 hours	13	84.5	100
"Colloidal sulfathiazole" with aerosol 1 c.c.....	100 mgm.	5 hours	12	100	100

conceived the idea that the addition of a wetting agent to an oily suspension of sulfathiazole might increase its spreading properties in a moist wound, it was decided to investigate the following points.

1. The concentration of sulfathiazole in the blood at fixed intervals after the insertion into the thigh muscles of guinea pigs of equivalent amounts of dry sulfathiazole powder, a suspension of sulfathiazole in saline solution, a suspension of sulfathiazole in oil, and a suspension of sulfathiazole in an emulsion of the oil-in-water type.

2. The effect of very fine grinding of the sulfathiazole on its rate of absorption from an oily suspension in the tissues.

3. The effect of the addition of a wetting agent on the physical properties of an oily suspension of sulfathiazole, and on the rate at which the drug is absorbed from this suspension by the tissues.

The following agents were employed:

(a) *Sulfathiazole powder (S.)*.—This was packed into incised wounds in the thigh muscles of guinea pigs, and the wounds were then closed by continuous sutures through the muscles and through the skin.

(b) *Ten per cent sulfathiazole in normal saline solution (S.S.)*.—This was prepared by adding the sulfathiazole to the saline solution, which was then vigorously shaken by hand. It, and the remaining agents, were injected into the muscles through a hypodermic needle.

(c) *Ten per cent sulfathiazole in heavy hydrocarbon oil (S.O.)*.—This was prepared by placing the sulfathiazole in a mortar and adding the oil, little by little, with constant stirring.

(d) *Ten per cent sulfathiazole in hydrocarbon oil with the addition of 0.15% of the wetting agent, aerosol (S.O.A.)*.—The aerosol (Fisher Scientific Co.) was added to the oily suspension (c), which was then vigorously shaken by hand.

(e) *Ten per cent "colloidal sulfathiazole" (C.S.)*.—This is a suspension of sulfathiazole in hydrocarbon oil, which is prepared by very fine grinding of the sulfathiazole crystals in a roller mill. (Lincoln Biochemical Laboratories, Toronto). The term "colloidal sulfathiazole" is conveniently used to indicate the fine grinding of the crystals. It is not accurately descriptive, as the suspension is not truly colloidal.

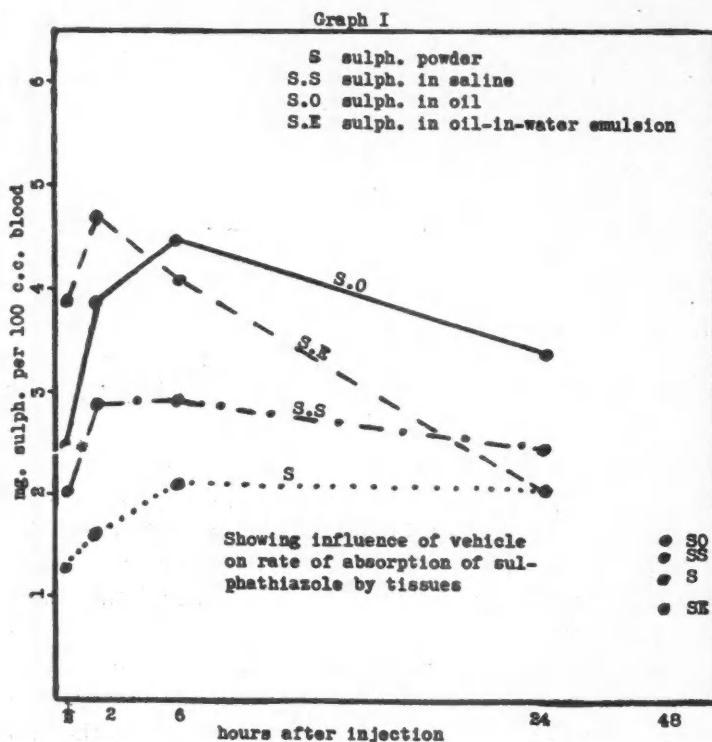
(f) *Ten per cent "colloidal sulfathiazole" (e) with the addition of 0.15% of the wetting agent, aerosol (C.S.A.)*.

(g) *Ten per cent sulfathiazole in an emulsion of the oil-in-water type (S.E.)*.—The soluble oil base is composed of 44 grm. paraffin oil (S.A.E. 30), 2 grm. triethanolamine and 6 grm. oleic acid (added until clear). Into this is mixed 1.8 grm. of sulfathiazole. Four c.c. of water are then added and the mixture emulsified by shaking.

(h) *Ten per cent "colloidal sulfathiazole" in an emulsion of the oil-in-water type (C.S.E.)*.—This is prepared in the same way as (g), using 50% "colloidal sulfathiazole" (e) instead of unground sulfathiazole crystals.

Mean sulfathiazole concentrations after the injection of each of these agents, in amounts equivalent to 200 mgm. of sulfathiazole, together with the number of estimations upon which each mean was calculated and the standard deviation of each mean, are shown in Table I. In Table II and in Graph I, mean blood sulfathiazole concentrations are compared to show the influence of the vehicle upon the rate of absorption of the suspended drug. Table III and Graphs II and III show the influence of particle size upon the rate of absorption, and Table IV and Graphs IV and V show the effect of the addition of a wetting agent. These figures show certain significant* differences in the mean blood sulfathiazole concentrations, and we feel that it is safe to assume that these differences are due to the attributed causes, namely, the vehicle in which the drug is suspended, the size of the sulfathiazole particles and the presence or absence of a wetting agent in the suspension. While a fixed dose equivalent to 200 mgm. of sulfathiazole was used in all experiments, regardless of the weight of the guinea pigs, we do not think that this in any way invalidates our results. We are satisfied that there was little variation in the average weight of the animals in the various groups, and in a small number of experiments (six in each group) we found that the relationship of the curves formed by the mean blood sulfathiazole concentrations after injection of sulfathiazole in oil, sulfathiazole in oil with aerosol, "colloidal sulfathiazole" and "colloidal sulfathiazole" with aerosol, in doses of 0.5 mgm. per grm. weight of guinea pig, were practically identical with those obtained in the larger groups in which a fixed dose of 200 mgm. was used.

* The difference between two percentages may be presumed to have significance if it is greater than twice the standard error of the difference.⁷



TREATMENT OF EXPERIMENTAL WOUNDS INOCULATED WITH *Cl. Welchii*

In previous work⁶ it was shown that the mortality rate in a group of 85 guinea pigs with open muscle wounds inoculated with *Cl. Welchii*, was 62.3%, and that in a group of 75 guinea pigs treatment of such wounds with 150 to 200 mgm. of sulfathiazole, applied immediately after infection and at 24-hour intervals for 6 days, reduced the death rate to 12%. Reed and Orr^{4, 5} found that if the infected wounds were tightly closed by continuous sutures, the mortality rate was 100%, and that the insertion of 150 mgm. of sulfathiazole powder into the wounds, before suturing, led to recovery of 97% of the animals. In view of these results it was decided to use smaller doses (50 and 100 mgm.) in an attempt to determine the relative potencies of sulfathiazole powder, "colloidal sulfathiazole" and "colloidal sulfathiazole" with aerosol as agents for the local treatment of experimental wounds inoculated with *Cl. Welchii*.

A suspension of *Cl. Welchii* was prepared by centrifuging 20 c.c. of the supernatant fluid from a 24-hour meat broth culture, and suspending the sediment in 3 c.c. of a mixture of equal parts of the supernatant fluid and 10% watery solution of calcium chloride. Guinea pigs were anaesthetized by intraperitoneal injection of a solution of nembutal. The hair was clipped from the outer aspect of a thigh and an incision about 3 cm. in length was made through the skin and deeply into the underlying muscles. The edges of the muscle wound were crushed with artery forceps, and into it was injected 0.1 c.c. of the bacterial suspension. In the untreated animals the wound

was then closed by continuous sutures through the muscles and through the skin. In the groups of animals selected for immediate treatment, the therapeutic agent was spread throughout the wound before inserting the sutures. In the group selected for delayed treatment, the wounds were re-opened after 2½ or 5 hours, the therapeutic agent inserted and the wounds resutured. The results of these experiments are tabulated in Table V.

SUMMARY AND CONCLUSIONS

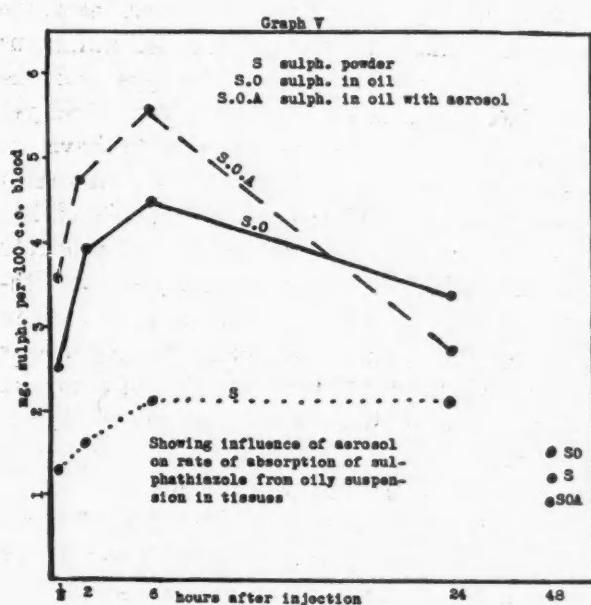
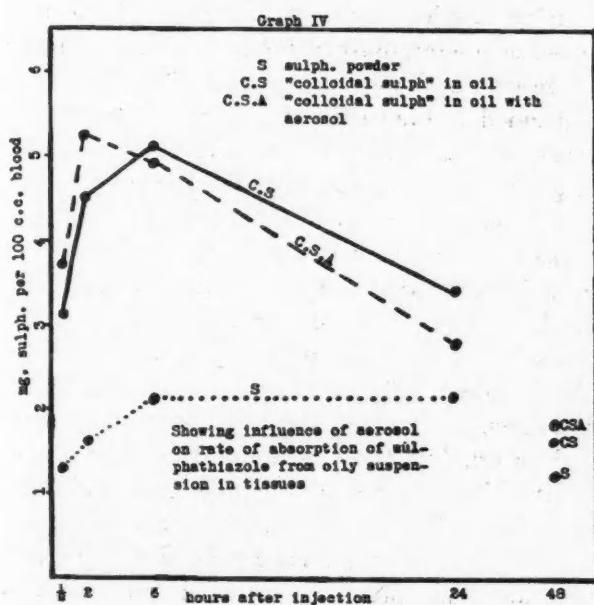
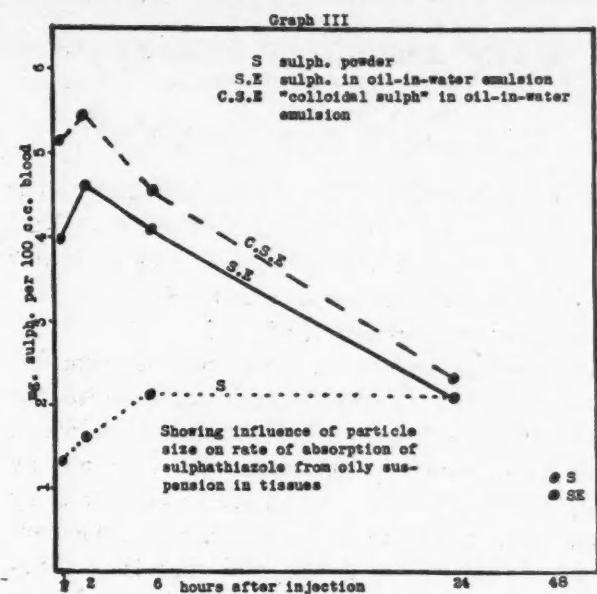
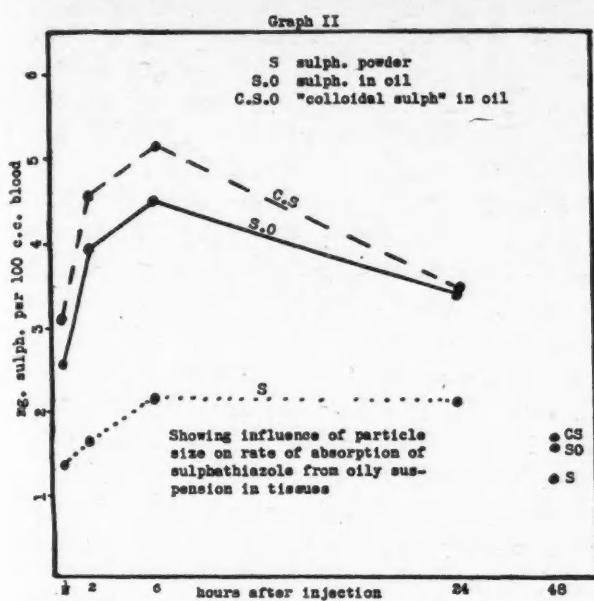
1. The belief, which is widely held, that the suspension of sulfathiazole in oil retards its absorption by the tissues, is erroneous. The rate of absorption of sulfathiazole from the muscles is greatly accelerated when it is injected in saline solution, in oil or in an oil-in-water emulsion. Absorption is more rapid from oil than from saline solution and is more rapid from an oil-in-water emulsion than from oil.

2. The rate of absorption of sulfathiazole from an oily suspension in the muscles is influenced by the size of its particles. Finely ground sulfathiazole is absorbed more rapidly than the unground crystals.

3. Absorption of sulfathiazole from an oily suspension in the muscles is accelerated by the addition of a wetting agent to the suspension.

4. Local sulfathiazole treatment of small experimental wounds heavily inoculated with *Cl. Welchii* is effective if instituted within 2½ hours after the organisms have been introduced into the wound. With a delay of 5 hours treatment is ineffective. It is probable that in man accidental infection of this type is always by bacterial spores and that there is a much longer interval between contamination of the wound and actual invasion of the tissues by gas-gangrene-producing organisms, during which interval prophylactic treatment with sulfonamides is likely to be successful.

5. In this work it was found that there was no statistically significant difference in the mortality rates in groups of animals treated with sulfathiazole powder and with oily suspensions of sulfathiazole. This is surprising in view of the great difference in the concentration of sulfathiazole in the blood following the insertion of equivalent amounts of these substances into the muscles, and the figures in Table V suggest that further work might have shown that the



slowly absorbed powder is the more effective bacteriostatic agent.

6. If it is true that a suspension of sulfathiazole in an oil-aerosol vehicle is as effective or nearly as effective as sulfathiazole powder in the treatment of small wounds, in which the powder can be evenly spread, it would seem probable that, owing to its physical properties, the suspension would be more effective than the powder in the local treatment of deep or lacerated lesions, throughout which a powder cannot be uniformly distributed.

Our thanks are due to Miss Janet Hutcheson, Miss Mercedes Lonergan and Miss Geraldine Delaney for valuable technical assistance.

REFERENCES

1. HAWKING, F.: *Brit. M. J.*, 1941, 1: 263.
2. *Idem*: *The Lancet*, 1942, 2: 507.
3. MCINTOSH, J. AND SELBIE, F. R.: *The Lancet*, 1941, 1: 240.
4. REED, J. B. AND ORR, J. H.: *The Lancet*, 1941, 1: 376.
5. *Idem*: *War Medicine*, 1942, 2: 59.
6. MAGNER, W.: Unpublished.
7. HILL, B.: *Principles of Medical Statistics*, The Lancet Ltd., 1939.

SUBSTITUTE FOR TALC ON RUBBER GLOVES.—Re-emphasizing the very serious surgical hazard from the use of talc as a dusting powder for rubber gloves, M. G. Seelig, D. J. Verda and F. H. Kidd, St. Louis, recommend in the *Journal of the American Association for* December 11, 1943, that potassium bitartrate be used as a substitute.

A FEW ASPECTS OF DISEASES IN THE TROPICS*

By Captain D. C. Bews, R.C.A.M.C.

THE probability that the final stages of the present war will be fought in the Far East is the indication for this discussion of a few aspects of diseases that are likely to be encountered in Japanese territory.

Diseases in general in the tropics are complex disorders. It is easy enough to separate the various clinical entities for textbook description, but these cases are not seen as often as one might wish. There are so many contributory causes to these diseases that have to be considered. Quite often one will find that a patient enters hospital for an operation and during the examination one discovers that he has a long history of attacks of fever, and the laboratory discloses the presence of numerous hookworms or other helminthic eggs and the fact that his blood count is very low. And yet the patient came to the hospital to have an operation. The rest of the picture does not seem to worry or affect him; he, in all likelihood, has been carrying on his usual occupation, probably not with full effectiveness, but nevertheless without realizing that his physical condition is in any way impaired. And while the picture as presented is most decidedly not that of a normal patient, it is a difficult task to assess all the contributory causes, as to the part they play in determining the final clinical picture.

It is, therefore, very important that all cases in the tropics should have the benefit of a fairly complete examination, including laboratory tests wherever possible. It is so easy to develop a tropical complex about diseases in the Far East and go looking for signs and symptoms of the outstanding conditions of which we usually think when we talk of tropical diseases. If we do adopt this course then we are going to miss a great deal that otherwise should have presented little difficulty if we had followed the usual means for making a diagnosis. It is quite true that physicians practising in areas of the Far East can often make a diagnosis, which may be right, too, with the minimum of history or examination, but this method is to be deplored. These men have had the benefit of great experience which has taught them that

certain specific disorders are prevalent in their part of the country, but this method of fitting symptoms to diseases should not be relied on for a final diagnosis. There really are no short cuts on the way to correct diagnosis.

A word should be said at this point on the importance of a laboratory in the tropics. The use of the microscope becomes an absolute necessity. Without its aid, even the most experienced consultant may come to grief, and without its assistance, diagnosis may be mere guess work. This does not mean that one needs to order all sorts of laboratory tests, but it does mean that the tests for which we utilize a microscope, particularly blood and stool examinations, should be done in nearly all the diseases which we may meet.

Often, probably much too often, the climate of the Far East has been blamed for a rôle in causing tropical disorders. It must, indeed, be listed as a contributory factor in the production of disease, and we must grant that it does exert a decided influence on the course of many diseases, but its effect on the average individual in good health has probably been overstated. A newcomer to the tropics very quickly adjusts himself to the new environment and seems to be able to maintain himself there without too much deviation from the normal. At first, the white races do seem prone to develop certain physiological irregularities, such as attacks of diarrhoea, headaches, insomnia, loss of appetite and so on, but these tend to disappear as the body adjusts itself to the new meteorological conditions. That is, of course, unless one insists on living, acting and eating in the same way as one has been accustomed to in this country. Then these physiological irregularities will become accentuated and may lead eventually to a breakdown in health or provide the basis for a predisposition to disease which otherwise should not have affected the individual. One of the worst offenders in accentuating these irregularities is the over-use of alcohol. The idea that alcohol in some form is necessary in the tropics is without foundation. Used in moderation, it is unlikely to cause any great tendency to a breakdown in health. However, the dangers of over-indulgence cannot be emphasized too much. Sir Leonard Rogers in writing on this point "Over indulgence in alcohol is responsible for more disability and shortening of life amongst Europeans in the tropics than any of the great tropical diseases". Rogers also

* Presented at Vermont State Medical Meeting,
May 14, 1943.

quotes the Duke of Wellington as expressing the best rules for maintaining good health in the tropics as follows: "I know but one receipt for good health in this country and that is to live moderately, to drink little or no wine, to use exercise, to keep the mind employed and if possible to keep in good humour with the world." Moderation in all things is thus the golden rule for maintaining health in hot climates.

Neurasthenia and the eventual breakdown of the white man in the tropics has often been attributed to the climatic factors of these parts. With this phase of medicine assuming such a prominent rôle in our armies, it might be worth while saying a word on this problem.

We are led to believe, and probably rightly, that the incidence of various types of psychoses in the tropics is greater than in our temperate zones. We must, however, remember in talking about the white man, that heretofore this group has been an unselected one. A good many of this group have gone to the east to get away from the strains and stresses of social life in their homeland. Anyone who has lived in the tropics can no doubt recall a good number of these misfits who have chosen this avenue of escape. As in psychosis of other lands, a cause for their disturbances is usually sought by these people and what is easier to blame in the Far East than the climate? Anyone who has had to go through the oppressive heat of the summer, or through the rainy season of six weeks to two months, is bound to have damned the climate quite thoroughly, and though these factors do cause an inability for concentrated efforts and a marked tendency to inertia, it is unlikely that they cause more than some mild type of neurotic tendencies, which after all is a human failing everywhere.

In talking of the incidence of mental disturbances of native races, it is best to remember that they are of a different herd and not be too ready to blame the climate for their instabilities. The psychological aspects of a race like the Japanese has a profound influence on the apparent rate, for example of suicides amongst them. A crime, a business failure of doubtful character, a love affair gone wrong, or anything likely to cause a bad name in the family tree may be atoned for by suicide. It's just the honourable thing to do.

The persons invalidated home because of a nervous breakdown are usually found to have

been subjects of some neurotic or temperamental inferiority before going abroad. The difficult climate with its condition of service, the psychological effect of living amidst people who do not speak your language, the disturbances resulting from the various forms of insect life and the mixture of noises that are part of the life in the East, may all be precipitating causes of the breakdown; in other words, they are capable of pulling the trigger, but they do not load the gun; predisposing and personal factors of the psychosis were probably there already.

The examination of candidates for the Armed Forces by psychiatrists before their induction should tend to keep the loss of manpower from this source at a fairly low level.

But, the climate with its high atmospheric temperature and high relative humidity at times is likely to give rise to a number of minor ailments that are rarely given much prominence in textbooks on tropical diseases and yet may cause infinite trouble and materially affect the fighting strength of an army unit. Chief among these minor ailments are the different forms of skin diseases. Prickly heat, which we may dismiss over here with a soothing lotion or a dusting powder, is not such an easy problem in the Far East. Manson-Bahr says that nearly every European in the tropics suffers from prickly heat, particularly, during the first part of his stay. The eruption, once fully developed, may persist for weeks or during the whole of the hot season and anything leading to perspiration immediately causes the eruption to reappear. Indirectly, the changes in the layers of the skin resulting from prickly heat provide a site for invasion by the micro-organisms of furuncular disease.

The frequency of prickly heat and other causes of pruritus, such as mosquito or sand-fly bites and parasitic infections which result in scratching, lead to many pyogenic skin infections, resulting from the transfer of staphylococcal and other pyogenic organisms from the hands to the affected areas. When insect bites become infected, which they do very easily in the East, it is not unusual for rather marked necrosis to take place at the site of the bite and healing is often a very slow process.

Boils are very common, with a marked tendency for widespread distribution. These multiple types of boil infections run a prolonged course, often assuming the form of so-called "blind"

boil in not coming to the characteristic pustular head, and causing a long and painful disability.

Other types of skin disease that are very prevalent are the parasitic infections, particularly tinea cruris (Dhobie itch) and ringworm of the feet (Hongkong foot, athlete's foot). The latter, a macerated condition of the inter-digital clefts and contiguous surface, with secondary infection superimposed, is more commonly seen in the tropics than over here. The Japanese system of public baths is notorious for the spread of these parasitic conditions. Preventive treatment will have to be adequate and rigidly applied.

Treatment of these conditions must be efficient and thorough, otherwise they are bound to cause a great deal of disability, and will result in considerable wastage of man power.

The maladies of Japan itself include a great many of the so-called tropical diseases. As has been pointed out on numerous occasions, the essential differences between the diseases of the tropics and the temperate zones is in the specific causes of such diseases and not in their geographical distribution. Given bad sanitary conditions, many diseases are able to flourish in any climate or country. It will be readily recalled that the tropical disease, malaria, was rampant in England in the Middle Ages, while cholera was all too common; typhus under the name of "jail fever" decimated the inmates of prisons and spread to the louse-infested countryside in the eighteenth century. Such conditions do exist in parts of Japan, even although the scale of her general sanitation and hygiene is on a much higher level than most other parts of the Far East. And while Japan's climate does not fulfil the requirements necessary for her to be included in the so-called tropical zones, her contacts with her colonies and adjacent parts of the tropics have resulted in many of the tropical diseases being found in her territory. This contact, of course, has been greatly intensified by the Sino-Japanese war and the present extension of the war in the Far East. And so, we may reasonably expect to run into most of the diseases in Japan that are classified under tropical diseases.

In spite of the enormous amount of literature that has been written on the surgical emergencies of war it is most likely that the medical emergencies of war associated with the same great diseases of past wars, namely typhus, dysentery, cholera, and enteric infections will

produce greater havoc amongst both troops and civilians than even the most terrifying up-to-date machines of destruction. In the present century, amoebic dysentery developed in Chicago, creating a serious health problem for a while, and most of us can think of the outbreaks of enteric fever such as occurred in Montreal a few years ago, that showed only too well that even in our civilized countries, a break in hygienic arrangements, even temporarily, may cause widespread infection. It is rather amazing how little we can fluctuate from our high standard of sanitary efficiency without serious consequences.

How we can hope to maintain this high degree of general hygiene and sanitation in the midst of centres of these infections in the Far East, is not easily answered. True enough, our troops will be protected against the enteric group, which should reduce its incidence to negligible figures; also against cholera, although the protection is not as lasting or as complete as in the enteric group. But there still remain the dysentery group, amoebic and bacillary, against which we are seriously handicapped as regards prophylaxis. Where excreta can be satisfactorily disposed of, flies kept down, and a pure water supply guaranteed, dysentery should not be a problem. But how these essentials are to be obtained in the mobile warfare of today amidst conditions of bad hygiene is difficult to visualize.

Another problem, too, confronts us. While our troops are protected against these various diseases, the huge civilian populations in the Far East are not in such a fortunate position and we must keep in mind that epidemics of cholera, typhus, enteric, and so on, are likely to be present amongst them and this will add considerably to our health problems.

It is true of Japan and the Far East that the commonest disorders that are likely to be seen are those associated with a breakdown in these sanitary and hygienic arrangements. The only group out of the diseases which follow bad hygiene that will be mentioned, is that which comes under the heading of tropical diarrhoeas.

When troops who have been stationed in the tropics, return to this country it is quite possible that some may have chronic intestinal conditions resulting from infections acquired in those zones. Most of the causes of tropical diarrhoea can be dismissed at once as ever being likely to cause or spread disease in this country. An exception to this, is the infection due to *Entamoeba histolytica* where the convalescent

carriers, those who have supposedly "recovered" from the disease, and contact carriers, who are really cases of asymptomatic amoebiasis, do constitute a potential source of danger to themselves and to the community at large. This will be discussed later under colonic diarrhoeas.

In order to appreciate the wide variety of causes which may have been factors in producing these chronic intestinal conditions, it is necessary to discuss the tropical diarrhoeas themselves to some extent.

N. Hamilton Fairley³ has defined diarrhoea as implying a derangement of intestinal or gastro-intestinal function, characterized by the passage per rectum of fluid or loose stools, with or without pathological exudate. Excessively rapid passage of food through the alimentary tract constitutes its essential basis; malabsorption of food constituents and inflammatory exudation from the mucous lining of the gut may be contributory factors.

The diarrhoeas in which we are chiefly interested in the tropics come under the heading of enterogenous, originating in the small bowel, and the colonic diarrhoeas, originating in the large bowel, and the colonic diarrhoeas, originating in the large bowel. These are separated largely to form a convenient etiological classification, not because they are distinctly separate disorders; only too often there are mixtures of gastro-intestinal or entero-colonic forms.

ENTEROGENOUS DIARRHOEA

The causes of this group may be divided into the following:

1. *Physical agencies*, particularly abdominal chill. Certain mild gastro-intestinal disturbances are extremely common and in particular, affect the white man on arrival in the tropics. These upsets are most certainly due to bacterial infections of a low pathogenic nature, although no specific organisms have ever been isolated. After a period of acclimatization, these attacks of diarrhoea disappear. Abdominal chill following exposure of the abdomen, especially during sleep, to draughts of air caused by fans may lead to a colicky diarrhoea, evidently local cooling of the skin from evaporation causes a chilling of the splanchnic vascular bed. The new arrival should be particularly warned of this danger. The use of a cholera belt by foreign residents or a *haru maki* by the Japanese, indicates their appreciation of this source of danger, although it is probably somewhat over-rated.

2. *Dietetic errors*.—Improper diet has always been an important factor in the causation of diarrhoeas. The consumption of large quantities of fruits such as mangoes, papaya or oranges may produce diarrhoeic symptoms. Also the sampling of native foods should not be encouraged, at least until the sources and manner of preparation of these foods have been examined.

Where the diet is controlled from a central source, as under army conditions, dietetic errors should not cause much difficulty. In the tropics, it seems likely that the carbohydrates and fats, the heat-producing foods, should be limited to some extent, but proteins can be taken in normal amounts, especially where the individual is using up as much energy as occurs under army conditions.

Food poisoning caused by the infection of food by organisms of the *Salmonella* group, notably *B. enteritidis* of Gaertner and *B. zerrtrycke*, is much more common in the tropics, as well might be expected. Infected meat, fish, milk, potatoes and milk by-products are the usual potential sources of danger.

3. *Bacillary infections* such as cholera, typhoid, paratyphoid A, B and C. As our troops will be protected against this group, no large scale problems should exist. Should cases occur, it is necessary to keep in mind that a more supportive type of treatment is necessary to combat toxæmia, dehydration, etc., than we are accustomed to give in the temperate zones. And prolonged convalescent periods must be given, as it does take longer to recover from illness amidst tropical conditions than in the stimulating atmosphere of this country.

4. *Protozoal infections*.—These are rare causes of diarrhoea, but must be kept in mind. *Giardia lamblia* is considered by some authorities to be pathogenic for man and to cause diarrhoeic symptoms. Whether this is so or not, it does seem reasonable in cases presenting symptoms of intestinal disturbance and diarrhoea, where large numbers of the cystic or free forms of *G. lamblia* are found on stool examination, that treatment directed against the infection should be given. The use of atebrin, the anti-malarial drug, appears to be the choice of treatment.

In certain pernicious attacks of malaria, in which the capillaries of the intestinal mucosa are filled with malarial parasites, dysenteric symptoms may be marked. Apparently the non-recognition of this condition led to a considerable mortality in the Great War.

Advanced cases of kala-azar may also show this symptom, but the clinical picture should lead to the correct diagnosis in this condition.

5. *Helminthic diseases*.—While infections with worms are extremely common in the Far East, this is a rather rare cause of diarrhoea. The widespread use of nightsoil for fertilizing the soil provides an admirable way of spreading these infections. The eating of raw vegetables and raw fish, the latter being regarded as a great delicacy in some countries, should be prohibited if possible.

6. *Steatorrhœas*.—Sprue, while usually occurring in white persons who have lived for a number of years in the tropics, may begin soon after their arrival or may not develop until after their return to a temperate climate. This condition should be regarded as a possibility whenever the symptoms and the history of residency in the tropics at a previous date, are present. A good number of persons who develop sprue on their return to the temperate zones, give a history of having dysentery, diarrhoeal attacks of gastro-intestinal disturbances while living in the tropics.

7. *Deficiency diseases*.—These are unlikely to be seen at all in the army where dietary control provides everyone with an adequate supply of the essential food constituents.

THE COLONIC DIARRHŒAS

This group constitutes the true dysenteric infections and may be classified as follows:

1. *Protozoal*.—(a) *Amœbiasis*—amœbic dysentery, liver abscess, etc., caused by *Entamœba histolytica*. (b) Balantidial dysentery due to *Balantidium coli*—a rare parasite of man.

2. *Bacterial*.—The bacillary dysenteries due to the various strains of *Bacterium dysenteriae*—Shiga, Schmitz, Flexner-Boyd and Sonne.

3. *Helminthic*.—Bilharzial dysentery due to *Bilharzia mansoni* or *B. japonicum* and, rarely, to *B. hæmatobium*.

4. Post-dysenteries, irritable colon or mucous colitis.

The enterogenous diarrhœas are chiefly manifested by the presence of frequent brownish or brownish green stools of fluid watery consistency, the contents of the small intestine being rushed through to the cæcum in an unduly fluid state, the various forms of enteritis and food poisoning of the *Salmonella* group being typical examples, but various other types do

occur, such as the "rice water" stool of cholera, and must be kept in mind.

The characteristics of the stool in the colonic diarrhœas are somewhat different from those of the enterogenous group. The essential features of the acute form of this group is the passage of mucus and blood or pus. While mucus does occur in diarrhoea originating in the small intestine, the real mucoid stool originates in the large bowel. A sudden attack of diarrhoea in a previously healthy adult associated with tenesmus and passage of blood and mucus can hardly be anything but dysentery.

Given these symptoms, one must then decide what form of dysentery is present. In the differential diagnosis of the tropical diarrhœas, or in fact most of the tropical diseases, a good deal of dependence must be placed on the laboratory findings. In the diarrhœas the microscopic examination of the exudate is most important, but experience is necessary to avoid the pitfalls that confront the examiner. In general, if we are met with a severe dysentery, although not a mild one associated with a high fever, we can generally assume that it is bacillary in type. But the actual differential diagnosis of intestinal diseases is practically dependent on laboratory findings. However, in all cases of dysentery associated with a high temperature, marked collapse, severe tenesmus and the passage of large quantities of pus, Shiga infection should be suspected and as early as possible anti-Shiga dysentery serum should be injected intravenously without waiting for bacteriological results. It must be given early and should be supplemented by sulfa-guanidine treatment. Sulfa-guanidine has given such good results in the treatment of bacillary dysentery that it can now be regarded as a specific cure for both acute and chronic cases.

The protozoal disease, amœbiasis due to *Entamœba histolytica*, deserves our attention in that it is one form of disease that can be brought back to this country and transmitted to others either directly by contamination of food or water with faecal material containing cysts or indirectly, by flies carrying the cysts from faecal material to foodstuffs.

Amœbiasis is a major problem in public health in many countries. Craig has estimated that 10% of the population of U.S.A., or 13 million people, harbour *Entamœba histolytica*. A reference to the tropical and subtropical lands shows a much higher percentage of persons infected.

In Canada it is difficult to estimate the numbers infected because of insufficient survey data, but from the figures at our disposal one might surmise that the incidence is quite low. However, other non-pathogenic protozoal cysts are fairly common, which indicates that the necessary faecal contamination of food or water has occurred, in spite of our relatively high standard of sanitation and hygiene.

Soldiers stationed in the tropics where these standards are low, may be expected to be exposed to greater danger of faecal contamination than in this country. As *E. histolytica* is present in a fairly large percentage of the population in these zones, it is reasonable to expect a considerable number of our men to be infected with this form. It may not cause clinical dysentery; it may exist without causing any symptoms or with such slight symptoms that the person is unaware that any abnormal condition is present. Nevertheless, such infected persons remain a danger to themselves and to the community at large.

It should be part of our examination of men who have been stationed in the tropics to do a stool examination, preferably repeated ones, using a concentration technique such as the zinc sulphate method of Faust, to determine whether they are infected with cysts of *E. histolytica*. If infected, these men should be treated by a course of yatren or other drugs that have proved very effective in the treatment of this condition.

The adoption of this attitude towards persons infected with *E. histolytica* should help considerably in preventing the spread of this disease, and should help to keep the incidence of *E. histolytica* infection at its present low level in Canada.

REFERENCES

- CRAIG, C. F. AND FAUST, E. C.: Clinical Parasitology, Philadelphia, 1940, p. 772.
- CALPIN, M.: Neurasthenia in the tropics, *The Practitioner*, 1935, 135: 146.
- FAIRLEY, N. H.: The tropical diarrhoea, *The Practitioner*, 1935, 135: 167.
- FAIRLEY, N. H. AND BOYD, J. S. K.: Dysentery in the Middle East with special reference to sulfaguanidine treatment, *Trans. Roy. Soc. Trop. Med. & Hyg.*, 1943, 36: 253.
- FAUST, E. C. AND CRAIG, C. F.: Clinical Helminthology, Lea & Febiger, Philadelphia, 1940, p. 780.
- MANSON-BAHR, P.: Manson's Tropical Diseases, 11th Ed., Cassells, London, 1942, p. 1083.
- MCARTURH, W. P.: Memorandum on Medical Diseases in Tropical and Subtropical Areas, H.M. Stationery Office, London, 1941.
- MINCHIN, R. L. H.: Dysentery and enteric fever as medical emergencies of war, *The Practitioner*, 1940, 140: 54.
- ROGERS, L. AND MEGAW, J. W. D.: Tropical Medicine, Churchill, London, 1942, p. 536.

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WHOOPING COUGH: SKIN TESTS*

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IT is not the purpose of this communication to review the literature on the efficacy of phase I pertussis vaccine in the active immunization of children. It is necessary to state, however, that adequate and convincing evidence has appeared in publications that children may be successfully immunized with such vaccines with usually only slight reactions. It is only by such clinical trials in control and vaccinated children with subsequent exposure that any reliable statistics may be produced.^{1 to 5}

Phase I pertussis vaccines have been definitely shown to be antigenic in mice, completely protecting them against an experimental infection which produces a fatal septicæmia in control animals.^{6, 7, 8, 10} This is in contrast to the statement made by Streat⁹ as follows, "Such vaccines merely induce a state of resistance whereby inevitable death on experimental infection is merely delayed". Although many reports have been published on the use of materials in skin tests for susceptibility and immunity to pertussis, none have been accepted as adequate in determining susceptibility or immunity. A skin test should not be accepted as satisfactory unless correlated with the incidence of clinical and bacteriologically proved whooping cough in control and vaccinated children after subsequent exposure. In an article by Streat⁹ the following statement is made, "This skin test appears to bear the same relationship to whooping cough as the Schick test does to diphtheria". There is no convincing experimental evidence to suggest that whooping cough is in the nature of a "toxin-antitoxin" disease. Further, whooping cough is not a "toxin-antitoxin" disease from a clinical standpoint in the same sense as is diphtheria. The child in the early infective stage of whooping cough is relatively well, often running around at play with a normal temperature and no abnormal physical findings other than a persistent cough and positive cough cultures.

Streat's claim is so definite that we considered it necessary to apply the test described

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by him to groups of children with and without a past history of whooping cough. This report, therefore, embodies the results of testing children and some adults with skin test pertussis toxin.*

MATERIAL

The skin test toxin was used as directed.* Skin tests were done on a group of 120 children, on 9 adults as well as on 4 children vaccinated with phase I *H. pertussis* phenol-killed vaccine. The tests were carried out by injecting 0.1 c.c. of the diluted toxin and diluted control material intracutaneously into the flexor surface of the forearm. Control tests were done on 100 of the 120 children. Readings were made 16 to 24 hours later. Reactions from 0 to 5 mm. showing erythema were classed as (+), unless the reaction was so small (2 x 2 mm.) that its interpretation might be held in doubt. Reaction from 5 to 15 mm. were classed as (++) and over 15 mm. classed (+++). Table I summarizes the results of our tests in 120 children of various ages.

TABLE I.
RESULTS OF SKIN TESTS IN CHILDREN WITH
PERTUSSIS TOXIN

Number of children	Age	History of whooping cough	Positive	Negative	Doubtful
23	Birth—1 yr.	19 — 4 +	8 4	6 0	5 0
64	1 yr.—5 yrs.	38 — 26 +	23 18	10 5	5 3
33	5 yrs.—14 yrs.	16 — 17 +	14 15	1 2	1 0

Discussion of results.—From the results of this study it would appear that the skin test employed is not reliable in differentiating between children who have not had whooping cough and those who have had the disease. The history obtained would indicate that the children had had whooping cough from six weeks to ten years prior to testing. Most children had contracted the disease well over a year prior to testing. The majority of individuals reacted less intensively to the control than to the test. This was true whether the control material was heated 30 minutes at 56° C. or after 30 minutes boiling. All of the nine adults tested gave a positive reaction of (++) or (+++). Six of

* The material for skin testing was kindly supplied through the courtesy of Dr. Murray Scott and Mr. Hodgkins of Ayerst, McKenna & Harrison.

the nine adults had received whooping-cough vaccine, whereas three adults had not. In six of the nine adults there was a definite history of whooping cough of years' standing, whereas in one adult there was no history of whooping cough and in two adults the history was doubtful. In three of four children who were tested before and after inoculation with phase I vaccine the skin test was positive and the extent of reaction remained practically the same before and after the giving of vaccine. The fourth child was not tested prior to, but showed a positive reaction after vaccination.

It is quite obvious from these results that this skin test in its present form is not a reliable index of susceptibility or immunity to whooping cough and in our opinion is in no way comparable to the Schick test for diphtheria. We are still convinced that clinical studies with phase I pertussis vaccines are the only firm basis on which to assess immunity to whooping cough.

SUMMARY

The pertussis skin test described by Streat and carried out according to directions appears to be not specific as judged by the evidence in this report in distinguishing between an individual who has had whooping cough and one who has not had this disease.

REFERENCES

1. SINGER-BROOKS, C. H.: *J. Pediat.*, 1939, 14: 25.
2. MILLER, J. J. AND FABER, H. K.: *J. Am. M. Ass.*, 1939, 112: 1145.
3. KENDRICK, P. AND ELDERING, G.: *Am. J. Hygiene*, 1939, 29: Sec. B, 133.
4. BELL, J. A.: Reprint No. 2297, *Public Health Reports*, 1941, 56: 1535.
5. PERKINS, J. E. et al.: *Am. J. Pub. Health*, 1942, 32: 63.
6. SILVERTHORNE, N., FRASER, D. T. AND HENDREN, G.: *Canad. M. Ass. J.*, 1938, 38: 556.
7. SILVERTHORNE, N.: *Canad. Pub. Health J.*, 1938, 29: 233.
8. *Idem*: *Canad. M. Ass. J.*, 1939, 41: 263.
9. STREAN, L. P.: *Canad. M. Ass. J.*, 1940, 42: 525.
10. SILVERTHORNE, N. AND CAMERON, C.: *J. Pediat.*, 1942, 20: 1.

RÉSUMÉ

Le test cutané décrit par Streat n'est pas un test spécifique et ne peut être considéré comme un indice absolu de susceptibilité ou d'immunité à l'égard de la coqueluche. Il est nullement comparable au test de Schick pour la diphtérie. Nous devons encore nous fier aux tests cliniques pratiqués avec les vaccins anti-coqueluches.

JEAN SAUCIER

AGGLUTININ TITRES OF POOLED SERA*

By Douglas G. Gemeroy, Ph.D.†

IN the past few years the use of pooled serum or plasma has become widely established as a valuable therapeutic measure whenever blood volume restoration is indicated in emergencies. In his excellent review of the literature, Aubert¹ has shown the conflicting views which may be found regarding the use of serum or plasma. However, the majority of workers in the field consider that either may be used with safety.

Although large amounts of serum and plasma have been pooled and stored in recent months for subsequent transfusion, very few studies have been carried out to determine the agglutinin titres of these fluids. Levinson and Cronheim⁴ state that serum pools as a rule are low titred and those composed of all the blood groups are quite safe for emergency transfusion without preliminary typing. They recommend that pools be made up of from thirty to fifty samples of serum, though no mention is made of the proportions of the different sera used. Della Vida and Dyke³ list a number of possible variations in the proportions of the different sera comprising the pool. Those composed of only A and B were found to have the lowest titres, though addition of O did not increase the titres of such pools to a degree that would be deemed dangerous. Aubert and co-workers (1942) feel that the iso-agglutinin content of pooled serum or plasma can be safely ignored if prepared by the technique used in the London Blood Supply Depot. They recommend pooling of sera in similar proportions to those stated by Della Vida and Dyke.

No definite proportions of the various blood groups comprising the pools, however, have been established to date as a standard. In some laboratories where serum or plasma is pooled in large amounts definite proportions of two or more sera are used, the amounts of each being more or less arbitrarily chosen. In other laboratories no attention whatsoever is paid to the types of serum or plasma comprising the pool, but only the volume of the final pool is considered. This is based on the assumption

that if a sufficient number of samples of sera is used the titre of the resultant pool will be low enough no matter to what blood group the recipients belong. Clinical use with such pooled serum or plasma has confirmed this view. Variations to a certain degree in the amounts of the different sera comprising a pool seem to have little effect on the iso-agglutinin titre and when the difference in the strength of the agglutinins is considered one can readily see why this is so.

The standard for pooling in Canada has been based on the approximate proportions of the different blood groups as found in the general population, i.e., Group O, 46%; Group A, 41%; Group B, 10%; Group AB, 3%. It was felt that where large amounts of serum were to be handled the above proportions would be most favourable, and that the absorption and dilution of the iso-agglutinins would give low titred pools which could be used in emergency transfusions without any severe reactions. Clinical tests carried out with such pooled sera confirmed this view and this procedure was used until the spring of 1942.

Though various workers have stated what they consider the optimum proportions of the different sera comprising a pool, little information is forthcoming as to the final agglutinin titre. It was felt that further research was needed to see if any variation in the proportions of the different sera used would give titres of a lesser degree than those obtained by the methods already in use. With this in mind the following experimental work was planned.

I. To determine to what extent the agglutinin titres of serum pools varied and the effect of the drying process on the titre.

II. To determine to what extent the proportions of the different sera comprising a pool could be varied and still give a reasonably low final titre.

III. To determine whether sera obtained from the donors' list, in numerical sequence and without regard to type, would give pools with titres as low as when definite amounts of each of the four serum groups were used.

MATERIALS AND METHODS

Blood serum.—The blood as received each day in the clinic is transported to the laboratory where a sample is withdrawn under sterile conditions for typing and serological tests. At

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the same time the clot is rimmed and quartered to allow as complete an expression of the serum as possible. All bottles of blood are then stored in the refrigerator over night. On their removal the following morning the serum is drawn off by suction into sterile centrifuge cups. After centrifuging for one-half hour the clear serum is drawn off into four-litre bottles in the proportions already enumerated. After Seitz filtration the serum is refrigerated until the drying process is carried out.

All sera used in the determination of agglutinin titres were procured under sterile conditions from the above mentioned four-litre pools, after standing for two weeks or more to allow absorption of the iso-agglutinins. The sera used in the experiments where varying proportions were tested were obtained from small portions remaining in the centrifuge cups, which, after mixing and filtering, were refrigerated for two weeks before using. The sera used for pools that were made up from the donors' list in numerical sequence were obtained directly from the bottles after the serum was drawn off. These portions were further centrifuged, then 2 c.c. samples taken from each and after mixing were filtered and stored in the refrigerator until used. In all cases they were allowed to stand for the two-week period prior to being tested.

Blood cell suspensions.—Fresh blood cell suspensions were procured twice a week. No preservative was used, the cells being allowed to stand in their own serum. If any sign of haemolysis was observed the cells were discarded but in practically all cases this was not necessary. On each test day, samples were secured from the stored cells and washed in physiological saline three times. An approximate 1% dilution was made from the washed samples and used only on one test day. The stock samples were used not longer than one week and as a rule for three days only. Before using the fresh suspensions were tested against their own sera as controls. Whenever new stock samples of cells were obtained they were tested against a standard serum and only those of average sensitivity, that is within the 20 to 40 titre range, were used in the tests.

Determination of agglutinin titres.—In the determination of agglutinin titres there does not seem to be any agreement among investigators as to the method and technique to be used, both tube and plate methods being gen-

erally acceptable. With the latter method as improved for our mass typing, maximum agglutination is produced by mechanical agitation for one-half hour. The degree of agglutination can be determined microscopically without transfer to a slide, which is often necessary with the tube method. Further advantages of the plate method are that the tests can be read in a much shorter time, and no centrifuge is needed. The plate method was used in all the tests.

All samples of serum were diluted in a series of marked test-tubes. After thoroughly mixing with a plugged pipette two large drops of serum, representing the particular dilution, were placed in one of the marked squares on a large ruled glass plate (each square being approximately one inch to a side). Transfer of the different serum dilutions in each series was started from the tube containing the greatest dilutions. A single plugged pipette was used for each series, but before proceeding to the next tube the pipette was blown out and thoroughly wiped.

One small drop of freshly prepared 1% A or B cell suspensions was added to the serum dilutions on the glass plate. The plate was then placed on the mechanical shaker and agitated for thirty minutes. After removal, the cells were allowed to settle for five minutes and agglutination titres determined microscopically. In all cases, duplicate dilutions of serum and added cells were prepared in parallel rows on the plate. The titre was recorded from the greatest dilution in each case.

EXPERIMENTAL RESULTS

To ascertain the variation in agglutinin titres of pooled sera and whether the drying process had any effect on the titre, fifty samples from pools chosen at random, were tested before and after drying, with A and B cells of average sensitivity (Table I).

To determine to what extent the proportions of the different sera could be varied and still

TABLE I.
AGGLUTININ TITRES OF NATIVE AND DRIED SERA

Number of pools 48	Titre of native serum with		Titre after drying with	
	A cells	B cells	A cells	B cells
Average.....	37	30	36	26
Standard deviation.....	±10.9	±8.9	±10.8	±8.4

give a low titred product, a number of pools were made up with different percentages of the four serum groups. The agglutinin titres of these pools are shown in Table II.

TABLE II.
EFFECT OF AGGLUTININ TITRE WITH VARYING AMOUNTS
OF DIFFERENT SERA

Sample	% of different sera	Pool titres with	
		A cells	B cells
I.	Pool I A = 80%, B = 20%	20	60
	Pool II A = 57%, B = 14% O = 29%	20	60
	Pool III A = 44%, B = 23% O = 33%	40	60
	Pool IV A = 47%, B = 10% O = 40%, AB = 3%	30	60
	Serum O (Orig. Titre)	110	100
	Serum A (Orig. Titre)	...	120
	Serum B (Orig. Titre)	120	...
II.	Pool I A = 80% B = 20%	20	40
	Pool II A = 57%, B = 14% O = 29%	20	30
	Pool III A = 44%, B = 23% O = 33%	20	30
	Pool IV A = 47%, B = 10% O = 40%, AB = 3%	20	40
	Serum O (Orig. Titre)	120	60
	Serum A (Orig. Titre)	..	80
	Serum B (Orig. Titre)	30	..
III.	Pool I A = 80% B = 20%	20	20
	Pool II A = 57%, B = 14% O = 29%	60	30
	Pool III A = 44%, B = 23% O = 33%	60	20
	Pool IV A = 47%, B = 10% O = 40%, AB = 3%	60	20
	Serum O (Orig. Titre)	140	100
	Serum A (Orig. Titre)	...	80
	Serum B (Orig. Titre)	140	..

If serum could be pooled without typing it would simplify the procedure greatly and eliminate the need of holding sera over until sufficient proportions of the different groups were available. To test the validity of such a method of pooling, 24 pools were made up from 2 c.c. samples of serum from each of 50 individuals as they appeared in numerical sequence on the donors' list. Titres were run on these pools directly after mixing, and again after allowing them to stand from two to three weeks to permit complete neutralization of the

TABLE III.
AGGLUTININ TITRES OF SPECIAL POOLS
POOL CONSISTS OF 2 C.C. OF SERUM OF 50 CONSECUTIVE
SAMPLES

Pool No.	Red cells	% of different groups				Titre directly after pooling	Final titre after standing 2-4 weeks
		O	A	B	AB		
1	A	46	46	6	2	20	10
	B					40	20
2	A	46	42	10	2	50	40
	B					30	10
3	A	46	35	11	8	40	30
	B					30	20
4	A	38	46	11	5	20	10
	B					40	10
5	A	48	40	8	4	50	30
	B					30	20
6	A	44	40	12	4	50	10
	B					30	10
7	A	48	38	10	2	60	20
	B					50	20
8	A	42	44	12	2	50	20
	B					40	10
9	A	38	48	12	2	10	10
	B					40	30
10	A	36	48	12	4	20	20
	B					30	20
11	A	52	34	12	2	60	30
	B					40	20
12	A	42	36	20	2	60	20
	B					20	20
13	A	40	44	10	6	30	40
	B					30	30
14	A	44	40	14	2	60	40
	B					30	20
15	A	42	46	10	2	60	20
	B					40	40
16	A	46	38	10	6	60	20
	B					30	30
17	A	32	50	10	8	40	30
	B					60	30
18	A	48	34	12	6	60	20
	B					30	30
19	A	50	40	6	2	60	50
	B					60	60
20	A	40	36	12	10	40	10
	B					50	20
21	A	54	40	4	2	60	10
	B					60	30
22	A	42	44	10	2	60	20
	B					60	30
23	A	46	34	16	4	40	40
	B					60	30
24	A	48	38	8	4	50	50
	B					60	40

iso-agglutinins. Table III shows the varying proportions of the different sera of which these pools were composed and the resultant titres directly after mixing and after they had been allowed to stand for 2 to 4 weeks.

DISCUSSION OF EXPERIMENTAL RESULTS

Agglutinin titres of pooled serum and the effect of the drying process on the final titre.—Table I shows the average agglutinin titres of 48 pools of serum before and after the drying process. The titres are slightly higher with A cells than with B cells. With both groups, however, the range is from 1 in 10 to 1 in 60, the averages being 37 and 30 for A and B cells respectively for the native serum. The dehydrating process has not affected the activity of the iso-agglutinins, since statistical treatment reveals no significant difference between the titres of the native and dried sera. When compared with the titres obtained by some investigators those recorded here may seem somewhat high. As a check on our method of determining titres, two sample pools that gave titres of 20 and 30 were re-run by the tube method and the titres obtained macroscopically with this method were somewhat lower.

By the mechanical agitation of the serum and cells it is felt that maximum agglutination is obtained and for this reason the plate method may give titres somewhat higher than those obtained with the tube method. In this respect there seems to be a definite need of standardization of methods for the determination of agglutinin titres otherwise the results are not truly comparable.

Varying the amounts of sera and effect on agglutinin titre.—An examination of Table II shows to what extent agglutinin titres are lowered when varying amounts of the different sera are used to make up the pool. In all cases the pools were allowed to stand for at least two weeks to allow absorption of the iso-agglutinins. The titres of the different pools though showing a range of 1 in 20 to 1 in 60 are definitely lower than the titres of the sera of which they were composed. It is readily understood that by dilution alone the titres would be decreased but the results indicate that this is not solely responsible for the lower titre produced. Schiff (1933) has demonstrated that the agglutinogens A and B are found in the various tissues of the body, and in the blood

plasma and serum. Dyke and Della Vida (1941) postulated that the agglutinogens are partly responsible for the lower titres observed when sera are pooled. Aubert and co-workers (1942) have confirmed the work of Schiff and have demonstrated by *in vitro* and *in vivo* experiments that these substances are found in the serum and plasma in varying amounts. They found that only serum with A agglutinogen was capable of inhibiting the anti-A agglutinin and similarly the anti-B agglutinin could only be inhibited by serum containing B agglutinogen. O serum with both anti-A and anti-B iso-agglutinins had no inhibiting effect at all. It would seem that where pools are desired with the minimum titre mixing of A, B and AB sera would give the best results. Therefore where sera of these groups are pooled there should be maximum absorption of the anti-A and anti-B iso-agglutinins by the corresponding agglutinogens. The addition of O serum to such a pool will no doubt produce a higher titre but not of a sufficient degree to be in the least dangerous when used for emergency transfusions.

The iso-agglutinin and agglutinogen contents of different sera vary within wide limits and for this reason it is exceedingly difficult to determine the optimum proportions of the different sera that should be used to make up the pool. Though the amounts of each type of serum used in the present investigation were varied in each pool nevertheless the titres are fairly constant. None of the combinations here tested have shown agglutinin titres differing significantly from the serum pools prepared in this laboratory with standard proportions of each of the four serum groups. Further where large amounts of serum are handled daily a pool comprising the various serum groups in the approximate proportions in which they are received is most practical.

Pooling serum without regard to type.—The results of the previous experiment show that serum may be pooled in varying amounts and such pools will give titres that are within the limits of those composed of standard amounts of serum of each of the four blood groups. An examination of Table III shows that when 50 samples are used in numerical sequence as they appear on the donors' list the pools so produced usually have an average number of the four serum groups, and the proportions of sera

may vary to an appreciable extent in the pools without affecting the final agglutinin titre. Preliminary tests carried out with 25 samples did not give a satisfactory distribution of the four serum groups. For this reason 50 samples were used.

To test the validity of such a method of pooling, 12 four-litre pools were prepared in this manner, i.e., by numerical sequence as they appeared on the donors' list without regard to type. They were tested for sterility and then filtered into one large pool thus completely mixing the sera of these 12 four-litre pools. This large pool comprised the sera from approximately 350 donors. This was now bottled into eight-litre lots and allowed to stand for a further two weeks before the drying process. Agglutinin titres were run on samples from each of these eight litre pools. These results (see Table IV) show agglutinin titres com-

TABLE IV.
AGGLUTININ TITRES OF SPECIAL POOLS

Pool No.	Titres with	
	A cells	B cells
3154	30	25
3155	25	30
3156	35	40
3157	30	35
3158	30	35
3159	30	30

parable to those obtained where definite proportions of each serum group comprised the pool. These results indicate that where sera are pooled in large amounts irrespective of type the resultant titre is reduced to a sufficient degree to compare favourably with any combination of sera that may be used.

SUMMARY

1. The agglutinin titres of 50 representative serum pools, both native and dried, were determined. The drying process apparently has no significant effect on the titre of serum.
2. The agglutinin titres of these pools range in value from 1 in 10 to 1 in 60 with both A and B cells, the average being 37 and 30 for A and B cells respectively.
3. Varying the proportions of the four different serum groups comprising a pool may be carried on within fairly wide limits without affecting the agglutinin titre of the pool.

4. The proportions of the different sera as used for a time at the Connaught Laboratories, i.e., O, 46%; A, 41%; B, 10% and AB, 3% gave a resultant pool with as low an agglutinin titre as that found with any other proportions of sera tested.

5. Serum can be pooled without regard to type if a large enough number of samples is used in the pool. This pooling in sequence as the numbers appear on the donors' list gives a final pool that compares favourably with any other combination of sera in its agglutinin titre. This simpler procedure has now been adopted by the Connaught Laboratories.

The author is indebted to Surgeon-Commander C. H. Best for suggesting the problem and to various members of the group for their interest and help.

REFERENCES

1. AUBERT, E. F., BOORMAN, K. E. AND DODD, B. E.: *J. Path. & Bact.*, 1942, 54: 89.
2. AUBERT, E. F., BOORMAN, K. E., DODD, B. E. AND LOUITT, J. F.: *Brit. M. J.*, 1942, 4247: 659.
3. DELLA VIDA, B. L. AND DYKE, S. C.: *The Lancet*, 1941, 1: 564.
4. LEVINSON, S. O. AND CRONHEIM, A.: *J. Am. M. Ass.*, 1940, 114: 2097.
5. SCHIFF, F.: *Die Blutgruppen und ihre Anwendungsgebiete*, Berlin, 1933.

FURTHER REPORT ON THE CANADIAN RED CROSS FOOD PARCELS FOR BRITISH PRISONERS-OF-WAR*

By Frederick F. Tisdall, M.D., F.R.C.P.(C)

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SINCE January, 1941, the Canadian Red Cross has packed and shipped nearly eight million food parcels for Canadian and British prisoners-of-war in Europe and the Far East.

From a modest beginning of 10,000 parcels weekly, originating from two plants, one in Toronto and the other in Montreal, the Society now operates five packing centres, in Hamilton, Windsor and Winnipeg, in addition to the previously mentioned two. The total output of these plants is slightly over 100,000 weekly, or 50% of the prisoners-of-war food parcels packed by the British, Australian, New Zealand and Canadian Red Cross Societies during 1943.

These parcels are shipped at regular intervals on International Red Cross ships from the Atlantic seaboard to Lisbon, Portugal or Marseilles, France, where they are sent by rail to

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Geneva, Switzerland, and from there distributed to the prison camps in Europe by the Red Cross.

Enclosed in each food parcel is an acknowledgment card for the prisoner to sign his name and give his rank and number. Often he makes some favourable comment on the contents of the package, but until recently no opportunity presented itself to interview and examine men from the internment camps.

However, during November last the opportunity arose in Britain when a number of Canadian Army and R.C.A.F. personnel were repatriated from Germany or escaped from Italy. The information obtained was so gratifying that it was felt worthwhile reporting it.

The food supplied by the Canadian parcel was carefully chosen on account of its high nutritional value as well as its palatability. The nutritional value has already been reported¹ and is again recorded in Table I. There are slight alterations in the weight of some of the foods from the amounts originally packed. In making up the package it was felt that the chief deficiencies in the food supplied by the Germans would be fat, animal protein, total calories and some of the vitamins, especially vitamin A.

Many of the men stated that they were sure

they would not have lived without the Red Cross food parcels. Some who did not receive any parcels for two or three months in the fall of 1941 were said to be so weak that they would collapse when they got out of bed.

The German diet consisted largely of potato and black bread, vegetables such as turnips, beets, occasionally carrots, and—from August until the end of the year—cabbage and a type of marrow. The amount of meat supplied was extremely small. Blood sausage was issued once or twice a week, and there was limburger cheese, which very few ate. The total fat issued was only about 4 ounces of margarine a week. There was a liberal issue of jam, apparently made largely of vegetables such as turnips, which few ate. There was a small issue of sugar, about 4 ounces a week. Few men took the tea and coffee supplied by the Germans. A liberal issue of barley was made but it was difficult to use it. The obvious nutritional defects of this ration are a lack of protein, fat, vitamin A, vitamin B₂, riboflavin, and calcium.

In devising the Canadian food parcel in 1941, it was decided that German water was just as good as Canadian water; therefore all foods were to contain as little water as possible. The total weight of the package was limited by

TABLE I.
FOOD ANALYSIS OF CANADIAN RED CROSS FOOD PARCELS FOR PRISONERS-OF-WAR IN GERMANY

	<i>Weekly amount</i>	<i>Daily amount</i>	<i>Calories</i>	<i>Protein</i>	<i>Fat</i>	<i>Carbo-hydrate</i>	<i>Vita-min A</i>	<i>Vita-min B₁</i>	<i>Vita-min B₂</i>	<i>Vita-min C</i>	<i>Vita-min D</i>
	<i>oz.</i>	<i>oz.</i>		<i>grm.</i>	<i>grm.</i>	<i>grm.</i>	<i>units</i>	<i>units</i>	<i>micrograms</i>	<i>grm.</i>	<i>units</i>
1. Whole milk powder.....	16	2.3	380	20	20	27	568	78	975	?	10
2. Butter.....	16	2.3	486	0	54	0	1,560	0	0	0	52
3. Cheese.....	4	0.57	61	4	5	0	325	2	121	0	0
4. Corned beef.....	12	1.7	106	13	6	0	0	0	108	0	0
5. Pork luncheon meat.....	10	1.4	131	8	11	0	0	144	81	0	0
6. Salmon.....	8	1.14					32	0	0	0	119
7. Sardines or kippers.....	4	0.57	111	10	8	0	22	0	64	0	90
8. Dried apples.....	8	1.14					50	15	30	0	0
9. Dried prunes.....	8	1.14	96	0	0	24	808	15	0	0	0
10. Sugar.....	8	1.14	128	0	0	32	0	0	0	0	0
11. Jam.....	16	2.3	160	0	0	40	0	0	0	0	0
12. Pilot biscuits.....	16	2.3	291	7	7	50	0	0	0	0	0
13. Eating chocolate.....	8	1.14	120	1	5	18	0	0	0	0	0
14. Salt and pepper.....	1	0.14	....	....	....	....	....	....	....	....	....
15. Tea.....	4	0.57	....	....	....	....	....	....	....	....	....
16. Soap.....	2	0.28	....	....	....	....	....	....	....	....	....
German Rations*			2,070	63	116	191	3,365	254	1,379	?	271
			1,840	57	?	?	360	570	900	104	0?
Total.....			3,910	120	116	191	3,725	824	2,279	104	271
Optimum allowance.....			3,000	70	....	....	5,000	600	2,700	75	400

*Figures of Camp Rations supplied by War Office, September, 1943, and obtained through the British Red Cross Society. Daily amount of calcium in German rations 250 mgm., in Canadian parcel 871 mgm. Total 1,121 mgm. Optimum daily allowance 800 mgm. Daily amount of iron in German ration 14 mgm., in Canadian parcel 10 mgm. Total 24 mgm. Optimum daily allowance 12 mgm.

international agreement to 11 pounds. As butter is the most acceptable form of fat, a one-pound tin was put in the parcel. Milk is the best single food from the nutritional standpoint, so a one-pound tin of whole powdered milk was included. This, when reconstituted with water supplies 18½ ounces of whole milk per day, or just under one pint. Experience in the last war indicated that if one had to live on canned meat day in and day out, the most acceptable form was corned beef, so a 12-ounce tin of corned beef was put in. In addition, a 10-ounce tin of pork luncheon meat was included.

In order to further increase the protein, an 8-ounce tin of salmon and a 4-ounce tin of sardines were added. Both types of fish have a comparatively high fat content. Also on account of its nutritional value, the parcel included 4 ounces of processed cheese. One pound of pilot biscuits, which are made of white flour and a very small amount of shortening and sugar, was supplied in the belief that they would be welcomed, particularly on account of the probable lack of wheat bread. One pound of jam, half a pound of sugar, one pound of dried fruit, a slab of eating chocolate, tea and salt and pepper made up the remaining food in the parcel. The reasons for their inclusion are obvious.

Since early in 1942, one food parcel each week was received regularly by each prisoner-of-war. The parcels were largely Canadian and British, although recently some American parcels were received. The following are the comments of the men on the individual articles of food in the Canadian parcel:

Butter.—The butter received first place in the comments of the men and was most welcomed. This may have been partly due to the fact that both the British and American food parcels contained margarine but not butter.

Powdered whole milk.—This was also one of the most desired articles. It was used in tea, in the cooking when this could be done, and as a straight milk drink. However, one of the favourite ways of using it was to add some of the chocolate and sugar and make a chocolate milk-shake. There was some question when the parcel was originally being devised whether the British soldiers would accept the milk as readily as the Canadians, who are notoriously large milk drinkers. The British were equally keen on the milk.

Meat and fish.—Favourable comment was made on the high meat and fish content of the

parcel. The men particularly liked the meat in solid form, so that they could chew it. Slightly over half gave first choice to the pork luncheon meat. The fish was not prized as much as the meat, but was still acceptable. The salmon had first choice and the sardines second in most instances.

Cheese.—The cheese used is a processed one which with any reasonable storage conditions will keep one to two years. It was most appreciated and many of the men said they would have liked more. In Italy in a percentage of the parcels, the cheese became mouldy.

Biscuits.—Consideration had been given to sending a sweet biscuit but information was obtained that it would be difficult to make a palatable sweet biscuit which would keep indefinitely and would not crumble in transit. Accordingly, with some doubt as to their complete acceptability, the biscuit chosen was a hard white one of the "pilot biscuit" type, although more palatable than the usual type of pilot biscuit. Surprisingly, the biscuits were well received. They were spread with butter and cheese or butter and jam, and also were broken into crumbs and used to thicken soup. However, the most popular ways to use them were to cook them in milk or after soaking them in water to fry them in butter—to make "the most delicious pancakes you ever tasted".

Jam, sugar, chocolate bar, tea and dried fruit.—The jam was excellent, and the supply sufficient. The half pound of sugar was very acceptable and the supply sufficient. The chocolate bar and tea were well liked. The supply of tea was adequate. Due to difficulties in obtaining different varieties of dried fruit, prunes and raisins were used predominantly. The men stated they would have preferred a greater variety if it had been possible.

The question of varying the contents of the parcel has been given serious consideration from time to time. Due to the fact that the packages and tins of food exactly fill the cardboard container, it is obviously not easy to change the size or shape of the different tins. From the standpoint of the likes of the men and the nutritional value of the food, no change should be made in the following foods: butter, whole powdered milk, cheese, biscuits, jam, sugar and chocolate bar.

If the Canadian parcel was going to be received exclusively, it would appear advisable to

alter the meat content at intervals to include a meat stew, sausage, etc., although no other readily available canned meat product has as high a nutritional value as the corned beef and pork luncheon meat. With regard to jam, the type used is purposely varied, including marmalade, corn syrup and honey. As already mentioned, the type of dried fruit is changed when possible.

The comment of one medical officer who was a prisoner-of-war in Italy for over one year and had the opportunity of observing and talking to many thousands of officers and men, is significant, namely, that they "had no change to suggest in the Canadian Red Cross parcel". A number of the other men had suggestions to make, but the fact that no two suggestions were the same is most significant. As the Canadian parcel is alternated with the British parcel, and more recently in some camps with the American Red Cross parcel, there would appear no need to vary the contents any more than is already being done.

Although the Canadian parcel contains salt and pepper, the value of the inclusion of spices was completely overlooked. In those camps where the men had facilities to do some cooking, they all stated that some spices or onion powder would have been invaluable. This omission is being rectified.

The nutritional condition of the men interviewed was excellent. They all stated that they felt fine and they had the appearance of well-fed men. There was no evidence of any skin affection suggestive of a nutritional origin. The same can be said of the tongue. The eyes were not affected. The gums were actually in better condition than the average civilian's of comparable age. In short, the general nutritional state of the men was everything that could be desired.

During the past year, out of every dollar contributed to the Canadian Red Cross, 47 cents was spent on prisoners-of-war food parcels. If the contributors to the Red Cross could have had the opportunity of talking to these returned men and hearing their story, they would have felt that they had never contributed to a more worthy cause.

REFERENCE

- TISDALE, F. E.: Canadian Red Cross food parcels for British prisoners-of-war in Germany, *Canad. M. Ass. J.*, 1941, 44: 77.

OBSERVATIONS ON COMMERCIAL BREAD AS A SOURCE OF B VITAMINS

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IN 1941 Tisdall and associates¹ reported on the nutritive properties of a white flour produced by a special milling process. They provided evidence that this flour contained considerably larger amounts of thiamin, riboflavin and niacin than did ordinary white flour, but appreciably less than did whole wheat flour. On the basis of vitamin determinations these authors concluded that bread made from this special flour would have nutritional advantages greater than those possessed by standard white bread.

Subsequently an official definition of special white flour with increased vitamin content, secured by milling procedures, was promulgated by the Department of Pensions and National Health. The special flour was designated as "Canada Approved White Flour", and bread made from it was named "Canada Approved White Bread". Both flour and bread are now widely available in Canada.

Tisdall *et al.* described the occurrence and distribution of the B vitamins in wheat kernels and pointed out that wheat is a good source of these vitamins. Data were provided for three grades of flour for the content of thiamin, riboflavin and niacin, but not for such other B vitamins as pyridoxin and pantothenic acid. In most publicity regarding Canada Approved White Bread attention has been given largely to thiamin. An impression might be secured that thiamin is the only B vitamin of importance. This is not the case. There is clear proof that human beings need riboflavin and niacin. While there is no such proof regarding pyridoxin and pantothenic acid, they have been shown to be necessary for animals and it is likely that they are essential for humans. The regulations regarding the vitamin content of flour and bread in the Food and Drug Act provide minimal requirements for thiamin and not specifically for the other B vitamins. Lack of attention to B vitamins other than thiamin is unfortunate because it tends to promote an illusion that fortification of ordinary white flour with thiamin gives the flour the nutritive value possessed by whole wheat flour. Wheat

is not a good source of riboflavin, in comparison with such foods as milk and liver, but is a good source of niacin, pyridoxin and pantothenic acid, as well as other B vitamins. Enrichment of flour with even three vitamins, as it is practised in the United States, does not restore to ordinary white flour the complete vitamin value which has been decreased in milling.

So far as we are aware there have been no published reports of actual feeding experiments designed to compare the vitamin contents of ordinary white bread, of Canada Approved white bread, and of whole wheat bread. For this reason, and also because of the undue emphasis upon thiamin, we decided to carry out a feeding experiment, using samples of the three types of bread as commercially available.

EXPERIMENTAL METHODS

Young albino rats reared in the Connaught Laboratories' colony were used at an initial weight of approximately 90 grams. For each type of bread a group of 16 animals, 8 of each sex, was employed. The rats were housed in individual, screen-bottom cages. Food was provided *ad lib.*, a condition which is comparable to that found in human nutrition. Water was freely available. The animals were weighed on alternate days.

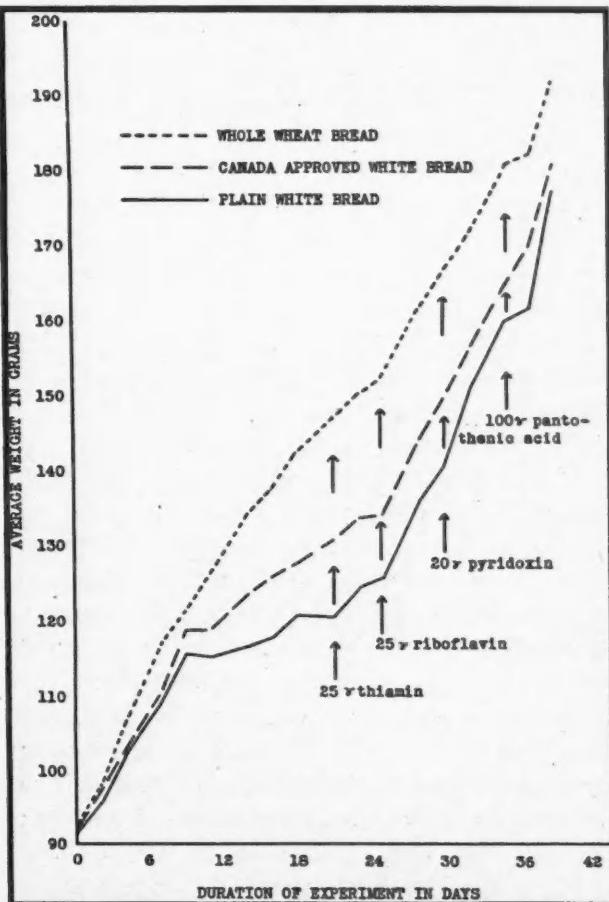
The rations were devised to resemble average human diets, as have been found in food consumption surveys in Toronto and elsewhere in Canada. A previous feeding experiment with bread carried out in this laboratory² has been criticized because weight increases might have been due to a number of factors (protein, minerals, various vitamins). In the present experiment the rations contained sufficient complete protein for growth, optimal amounts of vitamins A, D and E and of minerals, exclusive of the bread component. Bread furnished all of the B vitamins present in the ration. Protein, fat and carbohydrate were in a proportion fairly close to that found in human dietaries in Canada; protein supplied 15% of the total calories, fat 37%, and carbohydrate 48%. The proportion of these constituents is important because there is clear proof that the thiamin requirements of rats is inversely proportional to the fat content of the diet. The amount of bread in the ration was such that it was equivalent to six slices in a diet supplying 2,500 calories; this ratio is again one which is com-

parable to human dietary conditions. The composition of the ration was as follows:

Casein	18% (by weight)
Corn oil	16%
Cod liver oil	2%
Wheat germ oil	2%
Dried bread	25%
Cane sugar	33%
Mineral mixture	2%
Agar	2%

All of the bread used was purchased retail from a delivery truck of a large Toronto bakery, without the knowledge of the bakery. Prior to the beginning of the experiment sufficient of each of three types of bread (standard white, Canada Approved white and whole wheat) for the complete experiment was secured on one day and dried at low temperature (under 25° C.). The dried bread was finely ground in an electric mill and stored in closed containers until incorporated into the rations.

After a significant difference was apparent in the average body weights of the three groups it was decided to test the effects of supplements of four B vitamins: thiamin, riboflavin, pyridoxin, and pantothenic acid. Solutions of these were given by subcutaneous injection in such



Weight curves of animals with various types of bread.

amounts that each animal received per day 25 meg. thiamin, 25 meg. riboflavin, 20 meg. pyridoxin, or 100 meg. pantothenic acid. The effect of each vitamin was tested during a separate interval, varying from 4 to 6 days; the administration of each supplement was continual from the time first given throughout the balance of the experiment.

Experimental results.—The average body weight of all animals in each group was calculated. The average values have been plotted against time and the results are shown in the accompanying graph.

DISCUSSION

It will be noted that significant differences were found between the average body weights of the three groups on the 21st day of the experiment. It would be expected that Canada Approved white bread, properly prepared from flour meeting the specifications for Canada Approved white flour, would be superior to standard white bread and this was found to be the case with the bread which was used. It would also be expected that authentic whole wheat would be superior to Canada Approved white bread; this was definitely the case in this experiment.

The administration of thiamin to each animal in the three groups caused some gain in weight in animals on the standard white bread diet, a negligible difference in those receiving Canada Approved white bread and no change in those fed whole wheat bread. Inspection of the graph shows that the effect of thiamin, even in the case of standard white bread, was much less marked than the changes produced by other vitamins. So much attention has been given to thiamin in publicity regarding bread that the public might easily secure the impression that it is the only vitamin supplied by whole wheat which is of importance. While the value of thiamin is clearly established, other vitamins in wheat, which are decreased in the making of ordinary white flour and some of which can not be added as synthetics at present, are of great value. In this connection reference should be made to a recent report by Higgins, Williams, Mason and Gatz.³ They stated, "Fortification of the flour used in the bread component of the low thiamin-low riboflavin human diets with thiamin, riboflavin and niacin in the amounts indicated proved inadequate to promote satisfactory growth or to prevent pathological

changes in the liver, thyroid and pituitary glands of white rats". Their experiments clearly established the value of whole wheat bread.

The significant changes produced by riboflavin in the case of animals receiving ordinary white or Canada Approved white bread is easily seen in the accompanying graph. In the case of whole wheat bread riboflavin caused a slight gain in weight but the effect of extra riboflavin was much less than with the two white breads. Lest the result with riboflavin be interpreted as an argument for the addition of riboflavin to flour, it can be stated that the inclusion of a suitable amount of milk in the ration or of milk powder in the bread would have supplied the necessary amount of riboflavin.

Supplies of additional amounts of pyridoxin and of pantothenic acid caused alterations in the gain of weight of white bread animals but the effects upon rats receiving Canada Approved white bread or whole wheat bread were slight or nil. It should be noted that rats on the ordinary white bread ration had practically ceased to gain in weight prior to the administration of additional amounts of vitamins and that these supplements caused a rapid increase, bringing the body weight of these animals nearly to that of the animals on whole wheat bread. Examination of the weight curve for whole wheat bread animals shows that it is practically a straight line, suggesting that the extra supply of vitamins was probably unnecessary.

Bread was the only source of B vitamins in the experimental ration until the 21st day. The lack of effect of additional supplies of vitamins in the case of whole wheat bread indicates that the animals received optimal amounts of thiamin, pyridoxin, pantothenic acid, and probably also of riboflavin, from an amount of bread which was equivalent to six slices in a diet of 2,500 calories. While it is generally said that the results of animal experiments cannot be readily translated into estimates for the human, it is interesting to draw a comparison. An estimate of the amount of thiamin received by the rats subsisting on the whole wheat bread ration is 0.15 mgm. per 1,000 calories. It is widely accepted that thiamin serves in the body as a component of an enzyme system necessary for the utilization of carbohydrate. Unless carbohydrate metabolism is different in rats from that in humans, it would be expected that the need for

thiamin, in terms of food metabolized, would be the same in rats as in humans. It would not be expected that optimal requirements for the two species would be the same per unit of body weight and no such calculation will be here attempted. For the last three years it has been widely stated that the optimal thiamin requirement for humans is about 0.5 to 0.6 mgm. per 1,000 calories. In a recent report Keyes *et al.* concluded that 0.23 mgm. of thiamin per 1,000 calories was optimal. This estimate and the one secured for rats in the present experiment are in much closer agreement than either is with the currently accepted recommendation for thiamin requirement.

One possible criticism of this experiment is that the results are true only for the particular lots of bread tested and that bread may vary widely in composition. This is, of course, valid. The bread in question was that which was actually available to consumers from one large bakery. It would be an advantage to conduct similar experiments on a number of samples. The cost of such experiments and the time involved limit the number which can be done by most laboratories.

SUMMARY

In a feeding experiment in rats in which rations were designed to approximate human dietaries in Canada in the ratio of protein, carbohydrate and fat, in which bread was supplied in the proportion of six slices per 2,500 calories, and in which rations bread was the only source of B vitamins, it was found that Canada Approved white bread was more valuable than ordinary white bread but that whole wheat bread was markedly superior to either of the other two types. Separate administration of thiamin, riboflavin, pyridoxin and pantothenic acid showed that whole wheat bread, in the proportions used, supplied optimal amounts of thiamin, pyridoxin and pantothenic acid and practically an optimal amount of riboflavin; Canada Approved white bread furnished nearly an optimal amount of thiamin, pyridoxin and pantothenic acid but insufficient riboflavin; ordinary white bread was deficient in all four vitamins.

This investigation has been greatly facilitated by a grant from the Division of Natural Sciences of the Rockefeller Foundation.

REFERENCES

1. TISDALL, F. F., JACKSON, S. H., DRAKE, T. G. H., NEWMAN, L. H., WHITESIDE, A. G. O., MILLER, H. AND EDGAR, J.: The retention of the wheat vitamin in flour and bread, a problem of national importance, *Canad. M. Ass. J.*, 1941, 45: 101.
2. McHENRY, E. W.: Observations on the nutritive value of bread, *Canad. Pub. Health J.*, 1940, 31: 428.
3. HIGGINS, G. M., WILLIAMS, R. D., MASON, H. L. AND GATZ, A. J.: Some results of feeding rats a human diet low in thiamin and riboflavin, *J. Nutrition*, 1943, 26: 347.

RÉSUMÉ

Des expériences pratiquées sur des rats soumis à l'ingestion de pain dans des conditions rappelant à peu près les conditions humaines ont démontré que le pain blanc approuvé par le Canada avait plus de valeur nutritive que le pain blanc ordinaire, mais aussi que le pain complet était supérieur aux deux autres. Le pain complet contient les quantités suffisantes de thiamine, de pyridoxine, d'acide pantothéique et de riboflavine; le pain blanc approuvé par le Canada est insuffisant en riboflavine; le pain blanc ordinaire manque dans des proportions diverses des quatre vitamines mentionnées.

JEAN SAUCIER

ACUTE MEMBRANOUS STOMATITIS AND CONJUNCTIVITIS (A Report of Three Cases)

By Captain J. A. Langille, C.A.M.C.

THE term "maeulofibrinous stomatitis" was first used by Fraenkel¹ in 1888 to describe membranous and pseudomembranous infections of the mouth. Since then a number of cases have been described in which other mucous membranes have also been involved. Among these are cases reported by Neuman,² Christlieb,³ Moro,⁴ Laszlo,⁵ and Flusser.⁶

More recently, Walton *et al.*⁷ reported three cases similar to the above, which occurred in the Canadian Army in England, in 1940. Each had a purulent conjunctivitis and a severe membranous stomatitis, and was acutely ill. All failed to respond to the sulfonamides, and a Gram-positive diplococcus was isolated from the eyes and mouth of each. These were not agglutinated by any of the pneumococcal typing sera, and it was thought they probably belonged to the streptococcal group, type faecalis.

These cases were treated with transfusions of stored whole blood with spectacular results.

It was suggested that these cases may have been due to a vitamin B₂ deficiency, especially in view of the remarkable results obtained following transfusions. They also referred to an article by King⁸ which drew attention to the possibility of a deficiency of the pellagra-preventing factor (nicotinic acid) in cases of "trench mouth" and Vincent's disease.

Henry⁹ reported three cases which occurred in the R.A.F. in 1942. The patients were acutely ill with purulent conjunctivitis and membranous stomatitis. Skin lesions were also present. Swabs from the mouth failed to reveal Vincent's organisms in sufficient quantity, but streptococci were grown on culture. All cases failed to respond to sulfonamides, but responded promptly to small transfusions of whole blood.

Three cases similar to the above were admitted to the Halifax Military Hospital during the past summer. Two of these belonged to the Canadian Army, the third to the R.A.F.

CASE REPORTS

CASE 1

A soldier, aged 23, was admitted on May 24, complaining of a sore throat, sore mouth and sore eyes. The mouth and throat had become painful about ten days before admission. He was admitted to the unit sick bay and treated with gargles and sulfanilamide without improvement. The mouth condition became worse, and three days before admission to hospital his eyes became acutely inflamed.

He gave a history of having been employed in the woods throughout the greater part of the winter, and had joined the army about a month before admission. For the previous four months his diet had consisted almost entirely of meat, well cooked vegetables, white bread and pastry, without any fresh fruit or raw vegetables.

He was apathetic and mentally dull. A severe purulent conjunctivitis with marked photophobia was present. The lips were covered with reddish black scaly crusts, and a profuse mucopurulent discharge escaped from one corner of the mouth.

The mucous membrane of the cheeks, tongue, floor of the mouth, uvula, hard and soft palate, posterior pharyngeal wall and gingival margins was covered with large coalescing patches of thick greyish white membrane. These were easily removed and left freely bleeding surfaces. More than one-half of the buccal mucous membrane was involved on admission. There were twelve carious teeth.

Scattered over the arms, legs and trunk were a number of reddish brown patches about one cm. in diameter. These were quite flat and scaly, did not bleed readily, and resembled somewhat the rash of secondary syphilis.

Extending from the margin of the urethral meatus over the prepuce of the penis was a similar area about two cm. by one cm. This was covered with small reddish brown crusts which were readily removable and left a freely bleeding surface. The Kahn test was repeatedly negative.

The preauricular, submental and inguinal glands were enlarged. There were no abnormal neurological findings except those mentioned above. Balance of the physical examination was negative.

During the first two weeks in hospital there was little change in the patient's condition. The highest daily temperature varied from 101 to 103°. The stomatitis became more extensive, until the whole surface of the tongue and two-thirds of the buccal mucous membrane were involved. Various mouth washes, including perborate, potassium permanganate, a solution of sodium sulfathiazole, and lime water were tried without success. The conjunctivitis failed to improve under boric compresses and a solution of zinc sulphate. Thirty grm. sulfathiazole were given in five days without evident improvement. The leucocytes after four days of this was 8,100 with 60% polymorphonuclears and 40%

lymphocytes. One week later the leucocytes were 13,600.

A number of smears were taken from the mouth. In only one of these were Vincent's organisms found. The others showed a mixed flora, with a Gram-positive diplococcus common to all specimens. On culture this was found to be a non-haemolytic streptococcus. Several smears from the eyes were also examined and found to contain Gram-positive diplococci.

As might be expected, with the extension of the stomatitis and pharyngitis, it became daily more difficult to supply the patient with sufficient nourishment. For this reason it was suggested that fresh fruits, liver and cod liver oil should be added. On the fourteenth day in hospital, four oranges and a half pound of liver daily, and cod liver oil, 3 ii t.i.d., were ordered.

Improvement in the stomatitis and pharyngitis was rapid. Within a week the discharge had ceased, and the sloughing membranes had been replaced by healthy granulating surfaces. Within two weeks these had almost completely healed, and necessary dental extractions could be carried out.

The conjunctivitis was a bit slower in clearing, and cod liver oil, min. v in each t.i.d., was added to the treatment mentioned above. This appeared to hasten resolution. Two chalazions appeared on each upper lid during the illness. These were opened after the surrounding inflammation had resolved. Smears taken from these revealed numerous Gram-positive diplococci.

With the improvement noted above, the skin lesions soon disappeared and there was a marked rapid improvement in the patient's mental symptoms. He was discharged after five weeks in hospital, completely recovered, although he was still five pounds below his enlistment weight. A recheck one month later revealed a further gain of five pounds in weight, and no recurrence of any infection.

CASE 2

The second case was transferred from a military hospital for venereal disease, with a diagnosis of gonorrhoeal conjunctivitis following an acute urethritis, on June 18.

A member of the R.A.F. 20 years of age, he had first noticed a urethral discharge on May 15 while spending two weeks in the United States. He stated that he was terrified about this and was unable to eat as a result. Four days later he applied to an American Army hospital where he was admitted and given sulfathiazole. This caused rather severe vomiting. One week later, with a supply of sulfathiazole, he returned to his station. He was treated in the unit hospital for the next two weeks and received thirty grm. sulfathiazole. This also caused considerable vomiting. He was transferred to the V.D. Hospital on June 4, and there received an additional 35 grm. sulfathiazole. Again vomiting was quite severe, and after a few days he developed a severe infection of the eyes, and complained of frequent nosebleeds and loss of sense of smell.

On physical examination there was a severe bilateral purulent conjunctivitis, and a mucopurulent nasal discharge. The mucous membrane over the middle turbinates and septum was covered with large patches of greyish-white membrane. These were easily removed and left freely bleeding surfaces. A similar patch about two cm. by three cm. covered the upper part of the right anterior tonsillar pillar, and extended on to the soft palate. The preauricular and submental glands were enlarged. Mental dullness and apathy were quite marked. There were no skin lesions, and no urethral discharge was present on first examination. The Kahn test was negative. His blood picture four days after admission was: Hgb. 55%; red cells 4,250,000; white cells 21,550, polymorphonuclears 75% and lymphocytes 25%. Several smears from the eyes and mouth were negative for Gram-negative diplococci, but showed numerous Gram-positive cocci occurring in pairs and short chains. On culture these were non-haemolytic.

This patient was placed on sulfathiazole on admission, (24 grm. in the first four days), and energetic local treatment of his conjunctivitis instituted. Vomiting was quite troublesome, with marked anorexia. He developed an iritis with punctate keratitis. Cycloplegic drops and continuous boric acid compresses were ordered for this. The ulcerations in the nose and mouth became worse, and a urethral discharge reappeared. His highest daily temperature varied from 101 to 102.8°.

In consultation with the ophthalmologist, on whose service this patient was admitted, and the officer in charge of medicine, it was decided, as soon as the report on the first smears was obtained, to discontinue sulfathiazole, and to give him a full diet with the addition of cod liver oil, 3 ii t.i.d., and four oranges, and one-half pound of liver daily. The urethritis was treated locally.

This patient was also seen by the consultant ophthalmologists attached to the local R.C.N. hospital and was taken to this hospital for a slit lamp examination. This confirmed the diagnosis of iritis and keratitis. Some evidence of corneal vascularization suggesting a vitamin deficiency was also reported.

Two weeks on the above treatment was enough to clear up the eye, nose and mouth infections. The sense of smell gradually returned, the temperature settled to normal, the hgb. increased to 72% and the leucocytes became normal. Weight gain was six pounds.

After three weeks' treatment, vision had returned to normal, and the patient was able to get about and spend a considerable part of each day in the sunlight. The urethritis, however, did not clear up completely and the patient developed an acute arthritis of the right ankle. He was returned to the V.D. hospital for further treatment on August 4.

CASE 3

The third case, an N.C.O. in the artillery, aged 25, was admitted on June 27, complaining of sore eyes and sore mouth of four days' duration. He had been in the army about eight months and had spent two weeks in this hospital in February with acute streptococcal tonsillitis. He stated that in the intervening months his throat had always been a bit sore and that swallowing had been painful. Because of this he had been unable to eat certain foods. His diet during this time had contained no raw vegetables and very little fresh fruit. He had lost about five pounds during his illness in February, and an additional five pounds in the past two months.

He was admitted to another medical ward and treated with sulfathiazole (8 grm. on the first day, followed by 5 grm. daily), for three or four days without any evidence of improvement, before being transferred to the ward in which the above cases were being treated.

Examination revealed a well developed young man, obviously quite ill. Apathy and mental dullness, though apparent, were not so marked as in Case 1. There was a severe bilateral purulent conjunctivitis, with moderate photophobia. The lips were covered with reddish black scaly crusts, and several coalescing areas of greyish white membrane were present on the mucous membrane of the tongue, cheeks and pharynx. The preauricular and submental glands were enlarged. There was no rash on the skin. No sensory or motor changes of the extremities could be elicited.

Highest daily temperature varied from 100 to 102°. The Kahn test was negative. Blood picture shortly after admission showed Hgb. 88%, white blood cells 18,450, polymorphonuclears 75% and lymphocytes 25%. Smears from the mouth and eyes were negative for Vincent's organisms and fungi. They showed a mixed flora, with non-haemolytic streptococci in pairs and short chains reported in two specimens from the mouth, and one from the eyes. One specimen from the mouth also contained a haemolytic streptococcus on culture.

This patient was placed on a full diet, with oranges, liver and cod liver oil. Lime water mouth washes, and cod liver oil and a solution of zinc sulphate for the eyes were also ordered.

Response to treatment was very satisfactory. The temperature remained normal after the tenth day. The conjunctivitis had cleared up completely in two weeks, and at the end of three weeks the mouth lesions had healed.

This patient had one carious tooth removed while in hospital. He was discharged, completely recovered, four weeks after admission.

DISCUSSION

Three cases presented above have several interesting features in common:

1. They each had severe infections of the eyes and mouth.
2. Malnutrition, and a low intake of the principal vitamins, especially of vitamin B complex and vitamin C, were present in each.
3. Gram-positive diplococci, considered by the pathologist to be streptococci, were isolated from the lesions.
4. The infections were resistant to local treatment and the sulfonamides, but cleared up readily on a high vitamin diet.

I am indebted to Major T. G. Heaton, chief of the medical service of the hospital, and to Major G. H. Ingham, chief ophthalmologist, for their guidance and advice; to Capt. G. Wilson, Canadian Dental Corps, Surgeon-Lieutenant Viger, R.C.N.V.R., and Dr. R. P. Smith, provincial pathologist, for their assistance and advice, and to Brigadier R. M. Luton, Director of Medical Services, for permission to publish this report.

REFERENCES

1. FRAENKEL, E.: *Virchow's Arch.*, 1888, 113: 484.
 2. NEUMAN, I.: *Arch. f. Dermatol.*, 1889, p. 635.
 3. CHRISTLIEB, O.: *Inaugural Dissertations, Wurzburg*, 1895.
 4. MORO, E.: *Munsch. med. Wchnschr.*, 1911, 6: 296.
 5. LASZLO, A. F.: *Laryngoscope*, 1939, p. 208.
 6. FLUSSER, L.: *Munsch. med. Wchnschr.*, 1930, 35: 1483.
 7. WALTON, C. H. A. et al.: *The Lancet*, 1941, 2: 214.
 8. KING, J. D.: *The Lancet*, 1940, 2: 32.
 9. HENRY, T. C.: *Brit. M. J.*, Sept. 5, 1942, p. 273.
- c/o Dept. National Defence,
Ottawa.

STILL A PROBLEM.—Tuberculosis has been present for so long and people are so accustomed to it, that the interest of the public and of many public health workers is in danger of being sidetracked to more glamorous and exciting problems. This is a serious deterrent to accomplishment in this field. Further, the decline in tuberculosis, both in morbidity and mortality, in the last 40 years, may lead some to think that the problem is one of the past. Let there be no mistake in this direction. Tuberculosis continues to be a real problem. If, instead of comparing the tuberculosis rate of today with what it was 50 years ago, one will compare the tuberculosis prevalence and mortality of today with today's prevalence and mortality of other diseases, the present seriousness of the tuberculosis problem can be appreciated. In the most productive period of life, tuberculosis continues to cause more deaths than any other one disease.—Ed., *Am. J. Public Health*, 1943.

**THE USE OF CURARE IN ANÆSTHESIA
AND FOR OTHER CLINICAL
PURPOSES***

By Harold R. Griffith, M.D.

Montreal

IF anyone had suggested a few years ago that

I should present a paper on the clinical use of curare I would have been inclined to laugh, for to most of us curare has always been a fabulous poison vaguely connected with South American Indians and detective novels, useful in the physiological laboratory, but far removed from the realm of practical therapeutics. Nevertheless I have now to report its administration to 90 patients under general anaesthesia, and others have used it hundreds of times in various conditions.

Curare has long been known to science; in fact, the earliest reference to its use is in Hakluyt's description of Sir Walter Raleigh's voyage up the Orinoco in 1595, when even then the Indians were using it as an arrow poison. In 1814 Watterton and Brodie observed that asphyxia from respiratory paralysis was the cause of death in curare poisoning, and in 1840 Claude Bernard¹ confirmed this observation in a series of physiological experiments which have become famous. But the modern history of curare, or what one might call the "civilization" of the drug, dates only from 1938 when Richard C. Gill, an American who had lived for many years on the edge of the upper Amazonian jungle of Ecuador, and who had himself just recovered from an attack of spastic paralysis, led an expedition into this South American wilderness in the hope that he might obtain a sufficient quantity of curare and knowledge of its manufacture to make possible its use in scientific medicine as a treatment for spastic disease.

In his book "White Water and Black Magic", Gill² tells most interestingly of the difficulties, dangers, and final success of his quest. Curare, which among the Indians is known as "the flying death", is the most sacred and mystifying of all the strange drugs in the primitive pharmacopœia. Its secrets have been for centuries carefully guarded by the witch doctors who

make it, and for this reason any accurate information about its origin and its ingredients has been most difficult to obtain. Nevertheless, Gill returned to civilization with a large supply of the crude drug, a detailed history of its manufacture, and with botanical samples of over forty plants which the Indians use in making various kinds of crude curare. Through the co-operation of the Research Laboratories of E. R. Squibb & Sons, and Professor A. R. McIntyre, of the University of Nebraska, this crude curare was subjected to its first really thorough pharmacological study. The so-called "true curare substance" was separated from various other toxic ingredients which are present in the Indians' arrow-poison, and after extensive animal experimentation a product was obtained which seemed safe for human trial. This substance was offered to the medical profession for experimental study under the name of "Intocostrin", (Extract of Curare, Squibb).

Professor A. E. Bennett, of the University of Nebraska, began using intocostrin in order to minimize the traumatic effects of the violent muscular contraction in patients undergoing metrazol shock therapy for various psychiatric disorders. He³ and others⁴ have reported after many hundred injections that this preparation of curare is harmless to the patient, and extremely valuable in preventing the fractures which formerly resulted rather frequently from shock therapy. A recent report by Dr. J. A. Cummins⁵ tells of his experience with curare at the Ontario Hospital, Hamilton; and at the Verdun Protestant Hospital, Montreal, curare is being used to modify the effects of electric shock convulsions.

In June, 1940, Dr. L. H. Wright, of E. R. Squibb & Sons of New York, told me of this new work with curare and remarked how nice it would be if we could use some of it in anaesthesia to relax the muscles of our patients when they got a little too tense. I agreed that such an effect is often to be desired but was too horrified at the old poisonous reputation of curare to be seriously interested. I met Dr. Wright again in October, 1941, and asked him how he was getting on with curare in anaesthesia. He said he still thought the idea was sound, but that so far as he knew no one had tried it. I thought I had better not pass up a good thing any longer, so Dr. Wright kindly sent me some ampoules of intocostrin and in January, 1942, we began using it in the operat-

* Read before the Montreal Medico-Chirurgical Society, April 2, 1943.

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ing room of the Homœopathic Hospital of Montreal. We administered the drug intravenously to patients under general anaesthesia, and found that it acts quickly, producing in less than a minute a dramatic and complete relaxation of the skeletal muscles. Even under the most favourable circumstances, and with every general anaesthetic agent, occasions do arise when it seems impossible to get the patient sufficiently relaxed to make an upper abdominal exploration or to close a friable peritoneum. To have a drug at hand which will give the patient at these critical moments complete relaxation, uniformly, quickly and harmlessly, has seemed to us a blessing to both surgeon and anaesthetist.

ACTION OF CURARE

The typical curare action consists essentially of an interruption of nervous impulses to muscle, this interruption taking place at the termination of the nerve fibres at the muscle cells, and probably consists in a neutralization of the acetylcholine reaction which is the fundamental neuro-muscular stimulation mechanism. When a drug having a pure curare action is introduced intravenously it very rapidly produces a paralysis involving skeletal muscles, of which in practice the diaphragm and intercostals are the last to be affected. In moderate doses there is apparently no effect on cardiac or involuntary muscle. The drug is excreted almost as rapidly as it acts, so that the duration of action is transient. In our experience the effect is usually observed within a few seconds; attains its maximum in about five minutes, and does not last longer than fifteen or twenty minutes. There is a good deal of individual variation in patients as to the duration of effect, and this depends also to some extent on the depth of anaesthesia present.

Curare affects only the neuro-muscular junction and it is in no sense an anaesthetic agent. Therefore, we do not recommend its use to prolong the effect of spinal anaesthesia unless the patient is heavily sedated or a general anaesthetic is used in combination with the spinal. In two patients we repeated the injection during the same operation and obtained relaxation after each injection without harmful effect. There is some evidence, however, from animal experimentation that the drug may have some cumulative action, so we feel that in anaesthesia it should not be repeated indiscriminately but should be used only to overcome some critical

situation, and subsequent muscular relaxation should be maintained by the use of the anaesthetic agent itself.

USE DURING ANAESTHESIA

Intocostrin is marketed in 5 c.c. vials of a sterile aqueous solution which contains 20 mgm. of the pure curare substance to each c.c. We have found that 5 c.c. (or 100 mgm. of curare substance) is an adequate dose for the average adult. We make the injection intravenously, and quite rapidly, and have had no case of thrombosis or other local reaction. This dose is rather larger than that usually used by psychiatrists, but we feel that the conditions under which we work with curare in surgery are much safer than those of most psychiatric institutions. In the operating room we have the patient already asleep under the care of an experienced anaesthetist, with adequate oxygenation, a free airway, and every facility at hand for the proper control of respiration. In none of our patients have we observed any appreciable effect on the pulse or blood pressure. Respiratory depression and even cessation of respiration occurred in a few cases, but we are so accustomed to artificial control of the respiration in patients under modern anaesthesia technique that such an effect does not worry us at all, and there has never been any harmful postoperative disturbance. Almost all our patients have been under cyclopropane anaesthesia, but a few received nitrous oxide and ether. One young man undergoing cholecystostomy for a very severe acute haemorrhagic pancreatitis was given open ether with most unsatisfactory abdominal relaxation. He was given 5 c.c. of intocostrin and immediate relaxation ensued but there was also cessation of respiration. An endotracheal tube was introduced and anaesthesia continued with controlled respiration and cyclopropane and oxygen. I am glad to say that in spite of the ether, the curare and the pancreatitis, he subsequently recovered.

The drug prostigmin, which is allied chemically to physostigmine, apparently bears the closest resemblance to a true physiological antidote of curare. In patients with myasthenia gravis it acts to inhibit the choline esterase and to restore the acetylcholine preponderance at the myoneural junction.⁶ Since curare action is very similar to the effect of myasthenia gravis, prostigmin should quickly counteract the curare effect. For this reason an ampoule of prostig-

min should always be available when curare is given, although in our cases we have not had to use it.

After 25 cases we were so greatly impressed with the uniform results obtained when an adequate dose of curare was given that in July, 1942, Dr. Enid Johnson and I published a preliminary report on "The use of curare in general anaesthesia".⁷ This has led to further clinical trial by anaesthetists in the United States and Canada, and many have written me that they believe this to be an important new approach to the problem of muscular relaxation in anaesthesia. Dr. S. C. Cullen, of the University of Iowa, has recently published⁸ a report on the use of curare in 250 patients under inhalation anaesthesia. It is gratifying to learn that his work has confirmed our findings, and he says that surgeons with whom he works are enthusiastic about the results obtained. His technique of administration has been somewhat similar to ours, except that he gives the curare now more or less as a routine before the peritoneum is opened in patients with whom he expects to have difficulty in securing relaxation. He has administered the drug in fractionally repeated doses to a number of patients with a satisfactory result in prolonging the period of complete muscular relaxation. He feels that curare is much more depressing to the respiration in patients under ether than under cyclopropane, but in every case artificial respiration by manual compression of the breathing bag was all that was necessary to restore the patient to normal breathing.

During recent months we have not used curare very frequently, and our total series has grown only to 90 cases simply because we were satisfied with its efficacy and wished to keep it for cases in which it was really needed. Inadequate relaxation is not a frequent complication with modern anaesthesia technique and the good anaesthetist should not need curare every day or even every week. It is still a potentially dangerous drug, and I would not like to see it used indiscriminately by unskilled anaesthetists simply because they were too inefficient to obtain muscular relaxation by ordinary anaesthetic procedures. Also, one should not expect too much of the drug. According to our present knowledge, curare is simply a powerful but short acting adjuvant to anaesthetic agents, to be used in an unconscious patient to tide one over an emergency situation where complete relaxation

is demanded. We have found it to be required most frequently in strong, young adults who may be just as resistant to any anaesthetic agent as are some men to the effects of whisky. I do not recommend it as an aid during the excitement of a difficult induction, or for a short procedure such as the reduction of a dislocation, because in these cases such an agent as intravenous pentothal may do the work perfectly satisfactorily, and probably more safely.

So much for curare in anaesthesia and in psychiatry. One might speculate upon other possible fields for clinical use. Perhaps we may find it of value in the treatment of conditions in which there is too violent muscular contraction or too persistent muscular spasm. Gill had hoped that it would prove an effective treatment for the various forms of spastic paralysis. This dream has come true to a certain degree, and Burman⁹ and others are now advocating the use of curare and erythroidine hydrochloride for spastic and dystonic states. An obstacle to the effective use of curare in the treatment of these conditions is that its action is fleeting and cannot be long maintained. However, since the treatment of spastic paralysis is concerned largely with the re-education of muscles and nerves, a drug such as curare, which will give even temporary relaxation to those who are in a state of constant spasm, has proved to be a great help in bolstering the patients' morale and giving them confidence and hope. Cullen¹⁰ reports a case of tetanus successfully controlled by repeated curare injections; and it might be used for the control of eclamptic and other forms of convulsions in unconscious patients, providing that oxygen and means of artificial respiration were always at hand.

This, then, is the story of the transformation of a drug from the kettles and gourds of Indian witch doctors to the biological standardization and sterile ampoules of modern medicine. What chapters of the story remain to be told only time will show, but I think that enough has already been revealed to assure for curare a definitely useful place in our pharmacopœia.

REFERENCES

1. BERNARD, C.: Note sur la Curarine et ses Effets Physiologiques, *Bull. Gen. de Therap.*, 1865, 69: 23.
2. GILL, R. C.: *White Water and Black Magic*, Henry Holt & Co., New York, 1940.
3. BENNETT, A. E.: Preventing traumatic convulsions in convulsive shock therapy by curare, *J. Am. M. Ass.*, 1940, 114: 322.
4. GRAY, R. W., SPRADLING, F. L. AND FECHNER, A. H.: Use of curare in modifying metrazol therapy, *Psych. Quart.*, 1941, 15: 159.

5. CUMMINS, J. A.: Metrazol complications as affected by the use of curare, *Canad. M. Ass. J.*, 1942, 47: 326.
6. WALKER, M.: *Proc. Roy. Soc. Med.*, 1935, 28: 759.
7. GRIFFITH, H. R. AND JOHNSON, G. E.: The use of curare in general anaesthesia, *Anaesthesia*, 1942, 3: 418.
8. CULLEN, S. C.: The use of curare for the improvement of abdominal muscle relaxation during inhalation anaesthesia, *Surgery*, 1943, 14: 2.
9. BURMAN, M. S.: Therapeutic use of curare and erythroidine hydrochloride for spastic and dystonic states, *Arch. Neur. & Psychiat.*, 1939, 41: 307.
10. CULLEN, S. C. AND QUINN, C. S.: The use of curare in treatment of tetanus, *Surgery*, (Aug.), 1943, 14.

RÉSUMÉ

Le curare du commerce s'appelle "intocostrin" (Squibb). Il fut d'abord utilisé pour diminuer la violence des convulsions thérapeutiques produites par le métrazol, puis par l'électro-choc, puis, depuis janvier 1942, comme adjuvant de l'anesthésie générale, pour favoriser le relâchement des muscles abdominaux. Son mode d'action, on le sait, est son effet inhibant au niveau de la jonction myo-neurale, par neutralisation de l'acétylcholine. Son antidote est la prostigmine. Le curare ne doit pas être employé de façon routinière, mais dans les seuls cas où le relâchement musculaire ne peut s'obtenir autrement. Les états spasmodiques et les dystonies en profiteront peut-être. JEAN SAUCIER

ferent from the principles carried out in general surgery.

In the period between 1934 and 1940 we have had under our care slightly over 400 patients suffering from either acute or chronic peri-rectal suppurative disease. Of these, 205 cases were of the acute variety. In this presentation the phrase chronic peri-rectal suppurative disease applies to and will be synonymous with what is known as fistula-in-ano, and ano-rectal fistula. These patients presented themselves in private practice and in the public wards of our department. Acute peri-ano-rectal suppurative disease may be defined as an infective process of the peri-anal or peri-rectal tissues by one of the pus-forming organisms, with a strong tendency to become chronic after spontaneous drainage, or after surgical incision. It is strangely interesting, and often discouraging, that a peri-rectal suppurative lesion will so often persist in a chronic form following what appears to have been adequate surgical drainage. Infection by any one of the pus-forming organisms of the peri-rectal tissues presents itself as a stubborn refractory pathological condition, resisting cure under the simple surgical principle of drainage by adequate incision.

A dubious prognostic attitude is taken by some surgeons in cases of chronic and long-standing fistulæ, because on the one hand these are often regarded and labelled as tuberculous with a so-called doubtful prognosis; and, on the other hand, the fear of an incontinent ano-rectum militates against a complete and thorough operative procedure. In this series of cases under review the writer happily reports an ultimate cure in practically every case in which surgical measures were undertaken. In this reasonably large number of operative cases only one patient had anything resembling an inadequate ano-rectum.

ANATOMY OF THE ANO-RECTUM IN RELATION TO ANO-RECTAL SUPPURATIVE DISEASE

In order to deal adequately with acute and chronic peri-ano-rectal suppurative disease one must possess a thorough knowledge of the anatomy of the ano-rectum, particularly of the muscles and fascia of the lower part of the rectum and anal canal. An infective suppurative lesion may occur anywhere in the peri-ano-rectal region as follows: directly beneath the mucous membrane or squamous epithelium of the lower rectum and anal canal; between the various components and subdivisions of the ano-rectal sphincters and their fascia; far above the levator apron, or so far below this as to present itself under the perianal skin in the ischio-rectal fossæ. The term ischio-rectal abscess as commonly applied to many types of

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ano-rectal suppurative lesions is a very misleading one. This may be only one of the numerous sites where a pyogenic lesion may occur in this region.

MUSCULATURE OF THE ANAL CANAL AND ANO-RECTUM

The *external sphincter* muscle of the ano-rectal area is divisible into three portions, i.e., it is a trilaminar muscle. This, together with the puborectalis portion of the levator ani, the outer longitudinal muscle of fascia, and the inner circular muscle of the bowel (internal sphincter), forms a strong muscular cylinder encircling the lower rectum and anal canal. In other words, the external sphincter is not the superficial subcutaneous single muscle so often referred to in textbooks, but is actually a strong muscular cylinder completely encircling the anal canal and the ano-rectum, which at its uppermost level joins with a portion of the levator ani to enter into the formation of the ano-rectal ring. The three components of the sphincter ani externus muscle are: (1) sphincter ani externus subcutaneous; (2) sphincter ani externus superficialis; (3) sphincter ani externus profundus. Fibromuscular septa from the fascia of the outer longitudinal muscle of the rectum actually separate and divide off the three portions of the sphincter ani externus.

The *sphincter ani internus* (often described as the "internal sphincter") represents the inner circular muscle coat of the rectum which encircles the whole of the anal canal down to the anal intermuscular septum, i.e., down to the tops of the subcutaneous portion of the external sphincter. Its lower border can be felt and identified just below the muco-cutaneous border of the anal canal, about one-fourth or one-half inch from the anal opening. It does not form a narrow annular band as is so often depicted and is not the important arbiter of continence.

The *ano-rectal ring* is the muscle structure of prime importance guarding continence. The subcutaneous and superficial portions of the external sphincter, part of the internal sphincter, and any of the structures up to this ring, may be cut or sacrificed with impunity, and yet continence will be preserved. Continence is only lost with the sacrifice during surgical operations of this important muscle band. The ano-rectal ring is a composite fibromuscular band composed of: (a) The upper portion of the internal sphincter; (b) the longitudinal muscle fibres at this level of the rectum; (c) the puborectalis part of the levator ani posteriorly; and (d) the external sphincter ani profundus muscle. An important consideration in the treatment to be shortly outlined is the difference of the levels between the posterior and anterior parts of the ano-rectal ring. Posteriorly this ring lies at an approximate distance of two inches from the anal opening, roughly the second crease on the volar aspect of the index finger; anteriorly the distance from the anal opening is approximately one inch, roughly the first skin crease on the volar aspect of the index finger.

In other words, the ano-rectal ring anteriorly lies in a lower plane than the anorectal ring posteriorly. The ano-rectal ring slopes downwards from the posterior aspect as an inclined plane to the anterior part of the ano-rectal circumference, and lies at its lowest level at the anterior ano-rectum. This difference in levels is approximately one inch. This is an important consideration in operations upon ano-rectal fistulae, because posteriorly one can sacrifice muscle tissue with more impunity than one can anteriorly. The ano-rectal ring is thus the final and important arbiter as far as continence is concerned.

Certain landmarks in the anal and ano-rectal musculature can always be palpated and recognized. These landmarks are as follows: (1) The subcutaneous part of the external sphincter ani, which lies just beneath the skin at the anal opening and can be felt throughout its circumference; (2) the anal intermuscular septum; (3) the lower border of the internal sphincter ani, felt and recognized just above the groove of the anal intermuscular septum in the lower part of the anal canal; (4) the ano-rectal ring; (5) the puborectalis portion of the levatores ani.

ETIOLOGY AND PATHOLOGY

The causative agent in ano-rectal suppurative disease is in nearly every case one of the pus-forming organisms. The infection is often mixed, and varies from patient to patient. One may encounter pure cultures of *Staph. aureus* or *Staph. albus* or the *B. pyocyaneus*. As often as not one again encounters cultures of the colon group of bacilli, with or without an admixture of staphylococcus. In many of my cases the colon bacilli group were absent from the cultures, particularly so where no communication with the bowel existed. It is singularly strange that in the whole of this series of over 400 patients suffering from acute and chronic ano-rectal suppurative disease, only one had a true tuberculous infection. Routine cultures and tissue studies in the series under review simply did not reveal any infection by the tubercle bacillus. We were satisfied in this series of patients that the infection was not tuberculous, when healing occurred after proper surgical treatment (to be presently discussed); and when cultures and tissue studies failed to reveal the tubercle bacillus, or tuberculous granulation tissue.

Certain areas of the body are naturally predisposed to infection by pus-forming organisms. The loose fibro-musculo-fatty tissue spaces surrounding the terminal bowel and anal canal are for various reasons particularly predisposed to infection. In the lower animals large multicellular secreting glands can be demonstrated in proximity to the cloacal region. In the human subject these glandular structures can be demonstrated in either rudimentary or well developed form, running out from the region of the bases of the Morgagni crypts or pockets into the peri-anal and peri-rectal tissues. These extend out through the sphincteric tissues into the fibro-fatty spaces surrounding the rectum and anal canal, as shown by Lockhart-Mummery,³ Herrmann and Desfosses,⁴ Tucker and Hellwig,⁵ and Daniels.² Infection gains entrance through the crypts or pockets of Morgagni at the dentate line of the ano-rectum; secondarily infecting these racemose glands, and the peri-anal and peri-rectal spaces.

It is my opinion that at least any two of the following three factors are necessary in the production of peri-ano-rectal suppurative disease. Firstly, the passage of liquid or mushy stools, with the lodgment of waste debris in the Morgagni pockets; secondly, the presence of

rudimentary racemose multilocular glands in the peri-anal and peri-rectal tissue spaces; and, thirdly, lowered resistance to infection.

The pathological picture in acute peri-anorectal suppurative disease is both unique and characteristic. Here one has an infective suppurative process either under one of the layers of the bowel wall itself or in proximity to this segment of the terminal bowel surrounded by fibro-muscular-fatty tissue spaces. The one characteristic feature that distinguishes ano-rectal suppurative disease from pyogenic suppurative disease in any other part of the body is the fact that spontaneous cure never results from interference by simple surgical drainage, or spontaneous rupture outside of the abscess boundary, either into the bowel lumen or on to the perianal skin. It is doubtful whether spontaneous resolution ever occurs in cases of peri-anorectal suppurative disease without the formation of a chronic fistulous tract. Therefore the establishment of chronicity is characteristic following upon acute peri-anorectal suppurative disease, unless in the first instance the acute process is deliberately dealt with by adequate incision and excision of the lesion. An ano-rectal fistula has had its inception in an acute peri-anorectal inflammatory exudative suppurative lesion. It may be defined as a chronic fibrous contracted pyogenic tract usually with one or more branching ramifications which may or may not communicate with the lumen of the terminal bowel, and lying in close proximity to this. In my experience an internal opening was found in only a small percentage of my cases of ano-rectal fistulae; rather is there the strongest tendency for the lesion to point and rupture outwards on to the peri-anal skin between the anal canal and the tuberosities of the

ischia without the formation of an "internal opening".

Acute varieties.—The various pathological structural patterns of acute peri-ano and peri-anorectal suppurative disease was determined primarily by the sites of the infective suppurative lesion. Formation of a chronic pyogenic fistulous tract ultimately ensued. Such is the evolution of this acute exudative, productive, suppurative lesion. Ano-rectal fistula therefore portrays the end-result of acute suppurative disease in the tissues adjacent to the terminal bowel. The exudative process becomes a fibroplastic one. Ultimately a contracted pyogenic tract lined with granulation tissue, with one or more ramifications, is laid down. This is nature's best effort to arrest and wall off such a suppurative process. It is singular that such a suppurative lesion following upon spontaneous rupture or simple incision will not ultimately undergo resolution and cure as a result of nature's efforts. A muco-muscular tube (ano-rectum) implanted in the centre of these musculo-fascial spaces, surrounded by the bony structures of the tuberosities of the ischiæ, the sacrum, and the coccyx, presents an anatomical scaffolding which militates against natural cure and resolution of an abscess in this area.

Sub-cryptic abscess.—This type of acute suppurative disease presented itself 72 times in this series of 205 cases. The usual site of the infective process in the circumference of the anal canal was either anterior or posterior in about an even ratio. In passing the finger gently around in a circular fashion one finds a swollen area, oval in outline, lying just beneath the squamous epithelial lining of the anal canal. The suppurative process in sub-cryptic abscess has a very definite anatomic location. It extends out from the base of the Morgagni crypt and usually lies deep to the subcutaneous portion of the external sphincter muscle. Retrograde passage of a curved probe director through the Morgagni crypt will reveal an abscess cavity extending outwards under the peri-anum, usually deep and less rarely superficial to the subcutaneous external sphincter muscle.

Sub-mucous abscess.—This type of acute suppurative disease of the terminal bowel occurred 18 times in the present series. It is thus seen that this variety of suppurative disease is encountered rather rarely. It presents itself either as a complication in chronic anal fissure, or less often as an upward extension in sub-

VARIETIES AND PATTERNS OF ANO-RECTAL SUPPURATIVE LESIONS

SERIES OF 205 CASES OF ACUTE SUPPURATIVE DISEASE	
1. Sub-cryptic abscess	72
2. Low para-rectal or low ischio-rectal sublevator variety	51
3. Deep ischio-rectal sublevator variety extending outwards from between the various layers of the subdivisions of the external sphincter; extending outwards into the fossa just below the levator apron, only late breaking outwards and downwards; rarely, through the longitudinal fascia into the lower rectum	36
4. Submucous abscess	18
5. Supralelevator pelvi-rectal abscess	18
6. Retro-rectal abscess	10
<hr/>	
Perineal abscess from infected sutures following delivery	2 cases
205	

cryptic abscess. Pyogenic infection occurs in a certain percentage of chronic anal fissures. This infection may burrow downwards to form a direct anterior or dorsal abscess and fistula. On the other hand, the pyogenic process may burrow upwards, breaking through the intermuscular septum under the columnar epithelium at the top of the upper portion of the anal canal. Digital examination reveals a long, exquisitely tender indurated area, lying under the mucous membrane just above the dentate line. The presence of a co-existing anal fissure, suppurative cryptitis, or sub-cryptic abscess, will be ascertained.

Low ischio-para-rectal sublevator abscess.—This variety of ano-rectal suppurative disease occurred 51 times in the series. Next to the sub-cryptic type of pyogenic lesion it is the commonest type. This type of abscess is described in textbooks as ischio-rectal. The term herein employed is more descriptive and accurate. The exudative productive inflammatory process commences in the loose fibro-musculo-fatty tissue spaces lateral to the musculature of the sphincter ani externus, and below the pubo-rectalis portion of the levator ani. Laterally there is the tuberosity of the ischium, and, below, the floor consists of the peri-anal skin. The presence of multiglandular structures is the most important predisposing factor which leads up to infection in this particular area.^{3, 4, 5} They are rudimentary left-overs from the cloacal sex glands of the lower vertebrates. Their large main ducts are to be seen, when present, to open up at the bases of the Morgagni crypts. This has been demonstrated by Tucker and Hellwig,⁵ Lockhart-Mummery³ and Daniels.² In my opinion the etiology of para-rectal suppurative disease is dependent upon a lowered resistance to pathogenic organisms in the presence of rudimentary multilocular (primitive sex) glands running out into the ischio-rectal tissue spaces. A large percentage of ano-rectal fistulae result from this lesion as the end-result in its evolution. They may be bizarre in their patterns.

Deep ischio-para-rectal sublevator abscess.—This pattern of acute ischio-para-rectal suppurative disease occurred 36 times in our series. The inflammatory lesion has its seat high up in the roof of the ischio-para-rectal space, but below the puborectalis portion of the levator ani muscle. Pain and disability are present for days before any evidence of an acute inflammatory process presents itself externally between

the anus and the ischial tuberosity. In this type of suppurative lesion it is essential to carry out a careful digital examination, and the diagnosis is thus established by the intra-rectal route. Opposite the deep portion of the sphincter ani externus, lateral to the rectal wall but below the levator apron, digital examination will reveal extreme tenderness and a certain degree of resistance to the examining finger.

Supralelevator pelvi-rectal abscess.—This very serious type of para-rectal suppurative disease presented itself 18 times in our series. The pelvi-rectal supralelevator space under consideration is bounded above by the peritoneal roof, and below by the levator ani muscle. This space is bounded behind by the lateral ligaments of the rectum. In front in the male there are the bladder, prostate, and seminal vesicles; and in the female there are the broad ligaments and uterus. The signs and symptoms of this very serious type of pelvi-rectal suppurative disease may be varied and misleading. There may be lower abdominal pain with very little perineal discomfort. The pain may be localized to the hypogastrium or over Poupart's ligament. The case may have all the earmarks of acute appendiceal disease and has on occasion been mistaken for typhoid or paratyphoid fever.

Since this space is quite roomy there is very little tension resulting from a suppurative lesion here. The symptoms may therefore be all constitutional. Sweats, spiked temperature curve, signs and symptoms of general sepsis, will all tax the ingenuity of the attending physician or surgeon. There may be retention of urine in the male due to pressure on the prostatic urethra. One of my patients, a young man, was first operated upon for acute appendicitis. He subsequently developed, due to tension, retention of urine. Rectal examination revealed only a fair degree of tenderness high up on the right side above the levator apron. There was very little, if any, bulging into the rectum. Because of the two findings, retention with pararectal tenderness and a suggestion of some bogginess above the levator on the one side, a diagnosis of pelvi-rectal supralelevator abscess was made. When this space was opened and entered from below an enormous quantity of foul-smelling pus was evacuated. The patient quickly began to improve, his temperature dropped to normal for the first time in six weeks, and he ultimately made a good recovery.

Retro-rectal abscess.—This rather rare type of peri-rectal suppurative disease is not difficult to recognize. Above, the abscess is always limited by Waldeyer's fascia, i.e., it never extends very high up retro-rectally. Tenderness can be felt over the lower sacrum when the finger presses backwards in the rectum.

Perineal abscess from obstetrical causes.—Following upon post-partum repairs one may observe a peri-rectal suppurative lesion resulting from infection; or/also sloughing of a non-absorbable suture. One should employ nothing over a twelve-day chromic gut in doing perineal repairs and, certainly, if one uses non-absorbable materials, should employ them with great economy and strict asepsis. Two such lesions were observed by the writer following upon perineal obstetrical repairs.

CHRONIC ANO-RECTAL SUPPURATIVE LESIONS

This review summarizes our experience in approximately 200 patients seen during the past five years suffering from chronic suppurative processes in the ano-rectal region. I have decided to emphasize the relationship of such pyogenic tracts to the ano-rectal ring. With the exception of the high-lying suprarelevator pelvic-rectal abscesses all and sundry types of acute ano-rectal suppurative processes which are permitted to go on to the establishment of one or more pyogenic tracts will result in such tracts lying at levels below this ano-rectal ring. This last observation has proved of great importance in carrying out adequate surgical measures in excising such tracts. It was found in this review of chronic ano-rectal suppurative lesions that several important conclusions could be drawn with regard to the successful treatment of such chronic lesions. Firstly, a very small percentage of such chronic lesions have an internal opening; and, secondly, the majority of such chronic lesions lie below the level of the important ano-rectal ring which guards continence.

METHODS OF DIAGNOSIS

It is sufficient to determine before or at the time of operation whether the chronic pyogenic tract or tracts are located either below or above the important ano-rectal ring. This is the essence of the whole problem of ano-rectal fistulae. It is generally possible to evaluate the site of the tract in relation to this important anatomical ring at the time of examination in one's surgery. On the other hand, this can be

deferred until the time of operation. I would strongly deprecate the practice of carrying out a probing procedure in one's examining rooms. Such an examination is productive of no good and causes much pain. One feels gently but firmly through the operative wound during the fistulectomy operation for the long tubular delineation of the chronic fibrous pyogenic tract. After a short experience with fistulous lesions the feel of such a tract is quite characteristic and not easily missed. The feel to the gloved index finger is that of "long tubular firmness" having the consistency of scar tissue; in some instances it is even cartilaginous. The employment of methylene blue or other dyes to outline fistulous tracts leads to confusion and error. Many of these tracts do not take the dye, since they do not all have a clear lumen, and, moreover, diffusion into normal tissue spaces occurs in almost every instance. The ano-rectal ring in front and behind is located and the relation of any and all pyogenic tracts to this ring is determined during the operative procedure by the sense of touch.

TREATMENT

I will attempt here to present a crystallization of our experience in the treatment of this series of acute and chronic peri-ano-rectal suppurative disease. We have learned some very salutary things in such a large series of patients. Many experiences have through trial and error become established truths. The question of continence has in our considered opinion been settled upon a sound anatomical base. Any two-stage or multiple stage operative procedure is regarded by us as a failure to deal successfully with the whole lesion, whether acute or chronic at the first operative sitting.

Acute peri-ano-rectal suppurative disease.—In the treatment of acute peri-ano-rectal suppurative disease we deal with the lesion with two definite purposes in mind. In the first place the patient is suffering from an acute infective process, and one must provide drainage at the earliest possible moment without delay. Since resolution will never occur of itself, and since the application of heat with watchful waiting prolongs the patient's misery and favours spread, one proceeds with operative interference without delay. The second important purpose in dealing with an acute inflammatory lesion in the peri-ano-rectal tissues is to deal with the abscess in such a thorough manner at the first

sitting that it will not be subsequently necessary to subject the patient to a secondary operation for the cure of the inevitable fistula which always results from an inadequate operative procedure.

The following principles which we have adopted in the surgical approach to an acute ano-rectal pyogenic lesion applies with certain minor modifications to every variety of acute suppurative disease in this area. After preliminary sedation I employ "saddle anaesthesia", employing the smallest possible quantity of novocaine crystals intrathecally in the third or fourth lumbar interspace with the patient in the perpendicular position. I use between 40 to 50 mgm. of novocaine crystals dissolved in a few c.c. of spinal fluid. The patient is kept perpendicular for about two minutes and then laid flat. This gives a small circumscribed area of anaesthesia covering the anus, scrotum and perineum; the legs and lower abdomen are free. There have been no bad results with this small dose.

It is important in my experience to administer this anaesthetic with the patient sitting up (head on nurse's shoulder) and kept sitting up for about two minutes after the injection. This gives complete relaxation lasting at least three-quarters of an hour. Never should one attempt to deal with an acute abscess in this area under light inhalation anaesthesia of any sort. "Open de-roofing drainage" is the principle which is thoroughly carried out. The abscess is incised and the incision is carried out on to the peri-anal skin and through into the peri-anal fat and subcutaneous tissues forming an actual ditch as a continuation outwards of whatever intra-anal or intra-rectal incision and excision has been performed. This outward prolongation of the wound is exceedingly important. The whole roof of the abscess is removed and the wound now takes the shape of an elliptoid ditch extending outwards on to the peri-anal skin and into the peri-anal fat. In every case of sub-cryptic abscess and certainly in all other acute suppurative lesions it is necessary to incise through the fibres of the subcutaneous portion of the external sphincter muscle. In the deep fossal infections the profundus fibres are cut through in order to reach the depths of the abscess.

The salutary guiding principle in dealing with all acute peri-anal peri-rectal lesions is to incise to the bottom of the area of the acute inflammatory process regardless of the amount of

muscle that must be cut through in securing this end. *With this exception* the ano-rectal ring is not cut through. This anatomical structure is easily recognized, as already described.

I adopt the following procedure in pelvi-rectal supralevator abscess. I make my incision between the anal canal and the tuberosity of the ischium. I next plunge across the ischio-rectal fossa and through the fibres of the pubo-rectalis portion of the levator muscle. The abscess cavity is now reached. I next incise the fibres of the subcutaneous sphincter muscle only, towards the rectum. The wound is next carried outwards on to the peri-anal skin as a deep ditch. This has given us very happy results and in no one instance was it necessary to subsequently operate upon any such patients for fistula. Quite naturally, one cuts through a certain amount of sphincteric tissue in carrying out such a procedure, but I would like to point out with the greatest emphasis that such muscle is not sacrificed or lost. Merely cutting across the necessary amount of muscle fibre in order to adequately incise and de-roof the lesion does not entail the loss of such muscle. The ends of the severed muscle merely attach to the sides of the ensuing scar and the function of such sphincteric muscle, as proved in all our patients, is unimpaired. What follows is that there is merely a slight widening of the anal canal with a narrow bridge of scar tissue between the muscle ends that have been cut. The function of such muscle is as good as ever; moreover, in practically every case the ano-rectal ring was left intact.

Two very important factors contribute to the impairment of control so often observed in these patients and resulting in so much hesitation on the part of operators to carry out an adequate operation in suppurative disease. First and foremost, the damaging and pernicious effects of the post-operative rectal pack. Packing the wound postoperatively results in wide separation of the divided muscle ends, with a scar laid down practically the width of the packing. The muscle ends adhere to the sides of this heavy scar. The diameter of the anal canal is thus greatly widened and a certain measure of incontinence might ensue even where the ano-rectal ring is left intact. This wide separation of the muscle ends produced by the packing with adherence of the divided ends of the sphincteric muscle to the sides of this broad heavy scar is the factor which produces the incontinent anus.

The next important factor in operating upon ano-rectal abscess, and, for that matter, the chronic lesions as well, is the condition of the perineal body in the female patient.

Condition of the perineum in the female in relation to ano-rectal suppurative disease.—Where the perineal body is thinned out and ruptured as the result of parturition, ano-rectal suppurative disease presents itself as a troublesome problem. In such patients not only the pubo-rectalis portion of the levator has been ruptured, but concomitantly with this, the profundus and superficial portions of the sphincter ani externus, together with fibres of the outer longitudinal muscles of the bowel entering into the formation of the ano-rectal ring, have been torn and separated. In such patients only the subcutaneous portion of the external sphincter, which is a small circular muscle having no important insertions, rests between continence and the patient's complete incapacity. This is important to recognize; for the simplest incision of an ano-rectal abscess in such patients, even where no packing is used and where the incision is made most gingerly, will lead to incontinence. In fact the patient is practically incontinent before the occurrence of the ano-rectal abscess. One should first apprise the patient and her family of this important fact, and insist upon being permitted to carry out in collaboration with the gynaecologist a carefully planned anatomical perineal repair before discharge from hospital.

The short flat vulnerable anal canal (quite rare) as contrasted with the normal long tubular one.—The writer in his work upon Prolapse of the Rectum⁶ has drawn attention to the peculiar type of short flat anal canal found in certain individuals. Such a vulnerable anal musculature is patulous and flat instead of long and tubular. It is a rare occurrence; however, it renders ano-rectal suppurative disease an unhappy complication since there is very little muscle that one can safely divide before reaching the ano-rectal ring, which is very near the skin surface in comparison with normal individuals.

Ano-rectal fistulæ.—Complete excision in one stage of the whole chronic pyogenic fibrous granulating tract and any ramifications which may be present has been the keynote in our treatment of ano-rectal fistulæ. It is my considered opinion that future continence has nothing to do with a two-stage operation. Whether

or not an internal opening is present is of no consequence in the surgical removal of any and all chronic pyogenic tracts; the main tract in every instance is laid open into the ano-rectum and the necessary muscle and mucosa are divided until the floor of the pyogenic tract is reached and excised. One then has an actual ditch running into the ano-rectum and extending outwards on to the peri-anal skin surface, i.e., the same as in excising an acute ano-rectal abscess. Every blind sinus is converted into an actual, complete ano-rectal fistula during the process of excision. This is very important in my opinion, and unless such a tract is laid open into the ano-rectum one will encounter many failures. Next, one carries out complete excision of all lateral branching tracts, which are laid open and carried into the main incision. Methylene blue is never employed, for reasons already given. The sensitive touch of one's gloved index finger is the determining factor in recognizing pyogenic granulation tissue. At the completion of the operation a careful survey of the whole wound is carried out. Any overhanging edges are carefully trimmed, and one ascertains that the floor of the wound is smooth without any remnants of pyogenic tissue. The postoperative care of the wound in both acute and chronic peri-anorectal suppurative disease is of prime importance. Packing is absolutely forbidden. A firm pressure binder of the maternity type covering a large combine is carefully tied into place. Immediately after operation, i.e., within about two hours, hot boracic dressings are applied to the peri-anal area in both acute and chronic cases. The bowels are not disturbed, and are permitted to move at any time. Ordinarily, they will move on the third day. To hold them in a state of suspended animation according to the common idea is wrong and causes only distension and agony. The wound is then watched daily so that no bridging occurs. The diet may be one low in residue, but this is not essential. I allow all these patients practically a full diet (cellulose intake is reduced) from the second day on.

SUMMARY AND CONCLUSIONS

Experience with over four hundred patients suffering from acute and chronic peri-ano-rectal suppurative disease is recorded.

The newer anatomy is presented as of great importance in guiding the surgeon during all operative procedures in this area.

REFERENCES

1. MILLIGAN, E. T. C. AND MORGAN, C. N.: Surgical anatomy of the anal canal, *The Lancet*, 1934, 2: 1150.
2. DANIELS, E. A.: Anal fissure, anal spasm and anal stenosis, *Am. J. Dig. Dis. & Nut.*, 1936, 3: 775.
3. LOCKHART-MUMMERY, J. P.: Discussion on fistula in ano, *Proc. Roy. Soc. Med.* (Section Surg., Sub-Sect. Proct.), 1929, 22: 33.
4. HERRMANN, G. AND DESFOSSES, L.: Sur la muqueuse de la région cloacale du rectum, *Compt. rend Acad. d. Sc.*, 1880, 90: 1301.
5. TUCKER, C. C. AND HELLWIG, C. A.: Histopathology of the anal crypts, *Trans. Am. Proct. Soc.*, 1933, p. 47.
6. DANIELS, E. A.: Prolapse of the rectum, *New Internat. Clin.*, 1938, 4: Series 48.

RÉSUMÉ

Les échecs opératoires des affections suppuratives de la zone ano-rectale sont dûs pour une large part à la connaissance imparfaite de l'anatomie de la région. Chez nos 400 malades on a qualifié de chroniques les fistules anales et rectales tandis que les autres manifestations étaient aigues ou subaigues. La plupart ont guéri sans déficit fonctionnel sérieux. Les microbes en cause sont ceux de la série pyogène. Le processus infectieux débute toujours au niveau d'une des couches constituantes du côlon terminal. Les diverses variétés de lésions aigues sont déterminées par la localisation de la lésion suppurative. Il existe des abcès marginaux, sous-muqueux, ischio-pararectaques superficiels et profonds, pelvi-rectaux, rétro-rectaux et des abcès périnéens d'origine obstétricale. Les lésions chroniques se résument aux fistules et sont situées pour la plupart sous l'anneau ano-rectal. Le diagnostic de fistule est aisément établi par la palpation d'un long tube ayant la consistance du tissu cicatriciel. Les principes du traitement sont bien établis: pour les cas aigus, après rachianesthésie réalisant l'anesthésie en selle, l'abcès est ouvert et son pourtour complètement excisé, évitant la section de l'anneau ano-rectal. Le paquetage intrarectal est supprimé. Le périnée de la femme sera refait dans le cas où il aura été trop aminci. Quant aux fistules, l'excision complète est la règle absolue.

JEAN SAUCIER

THE TRAINING OF A MEDICAL OFFICER

By Major Basil D. Robertson, R.C.A.M.C.

THE training of medical officers at the R.C.A.M.C. Training Centre began in the early part of 1940, when reinforcement officers were given a course before going overseas. I, myself, have been privileged to serve in this task since December, 1940, and have been in a position to see the course develop to its present status.

There are several schools of thought as to what a medical officer should be taught before proceeding to his specific place in the war machine, and each is coloured more or less by the individuals who compose the several schools.

First, there are those who believe that the M.O. should have a preliminary common-to-all-arms training before proceeding to his special-to-arms course. A course of that nature would

give a thorough general army training, and would be a splendid thing for the young officer just out of school. But it would add a minimum of 4 weeks to his training time, and just now the facilities for putting on such a course are not available.

Then, there are those who feel that all military training for a medical officer is a waste of time; that it doesn't matter if he knows but little military etiquette, how to give and return compliments, his place,—and that of his medical unit,—in the general picture, so long as he is a good doctor. There are a good many of these persons; they are, and always will be, civilian doctors in uniform—and good doctors they are, too.

Then, there are those who feel that a medical officer is just as much an officer as is General McNaughton, and who believe an M.O. should know a good deal about the organization of the army and his place in that organization, so that he may function at his best through knowing what is going on about him, and the best and proper channels through which he can draw supplies and evacuate his casualties. This school feels, too, that it is important for the average M.O. to know how to orientate himself on a map, find a given place, and get himself, and those who are depending on him, to that place if the necessity arises: that he should know something of discipline—especially self-discipline—of how to protect himself and his patients, if chemical warfare should be used: that he should understand enough of tactics to follow a given situation clearly and, if necessary, make an appreciation thereof. Above all, they believe that an M.O. should be physically fit and able to endure the hardships of modern warfare with equanimity of spirit.

The latter course is the one being followed at the R.C.A.M.C. Training Centre, A22. At the present time, it is difficult to know just what one should teach as being important. But when one reads of the magnificent manner in which the M.O.s of the Imperials have been conducting themselves during the African campaign—after four weeks of a training quite similar to ours, but not quite as intensive—one is apt to think we are teaching about enough. Later, when an M.O. becomes attached to a unit, he can, if he so desires, learn all about small arms and vehicles, and so forth, during training and rest periods. It is felt, however,

that an M.O. who is paying attention to his own task during battle, who is doing his utmost to salvage the casualties and evacuate them for further treatment, has no time for the more spectacular parts played by his brother combatant officers, and is even failing in his appointed task if he endeavours to do so. Why then should we train M.O.s for a rôle which should never be undertaken?

Let us consider now some of the subjects we do teach the M.O. and some of the reasons for teaching them.

When an officer comes to our training centre he comes as a civilian doctor who has recently donned the King's uniform. He comes, either from civil practice, medical school, or perhaps from a research laboratory or a public health post. He must learn, first, how to conduct himself as a soldier and an officer, for twelve hundred other ranks are watching him, and will later be depending on him in many cases for leadership. We try, therefore, to instill self-confidence in him, by gradually, through mutual instruction on the parade square, getting him to the point where he can give, and also take, commands. He gradually gets to the point where he no longer feels conspicuous in uniform, where he pays and returns compliments without self-consciousness, and at which he feels that he is as much an officer and a soldier as his brothers-in-arms of the other branches of the service.

During the five weeks of training he is taught some subjects which are common to all arms, and of which he may have great need one day. Important among these are map reading, military law, protection against gas, the driving of army vehicles.

There are a good many periods devoted to hygiene and sanitation as it applies to the Army, for, actually, the rôle he will play in preventive medicine is much greater than that in any other field.

He is taught a good deal about the organization of the Army; its administration; how medical boards should be conducted; how to conduct a sick parade. He is given talks by specialists in some of the more important aspects of war medicine and war surgery. He is shown how first aid should be taught to the soldier in the field, and how the first field dressing can be used, most advantageously, in the treatment of the soldier's own, and his comrades', wounds.

THE REGIMENTAL M.O.

But the one part of the course which is emphasized most is how to become a good and efficient regimental medical officer. All the training harps back to this all-important subject repeatedly. For we believe that only by understanding the problems, the tasks, and the vicissitudes of the R.M.O. can any medical officer, regardless of his post, ever become as efficient as he should be.

It may be thought, as many do when they discuss the subject of M.O. training, that all the parade square work, route marches, concealment in the field exercises, tactics, map-reading and so on, are laid on a bit too thick. But there is a great deal more to the training than one sees superficially. Every officer who qualifies at this school, has experienced in some degree the very feelings which every soldier—the men with whom he is going to deal—has experienced. He has had sore feet; has learned the invaluable lesson that socks and boots teach one. He has experienced the fatigue which is borne of wearing web-equipment and pack on the march. He has learned to accustom himself to communal living, arising at reveille, making his own bed in the field and cooking his own food in a mess tin in the rain. He has learned to plot his course in the dark of night by compass; he has learned to defend himself, if need be, with a pistol. He has realized, again, the value of regular physical exercise and the value of adequate rest at night. He can jump to a command or he can give a command. He has learned how very valuable N.C.O.s are, and his respect for them will always stand him in good stead.

These principles are important. They give every officer a new insight into the every-day life of a soldier; make him more understanding, more sympathetic, if need be, and a better regimental medical officer.

We do not believe, for a minute, that every officer will absorb and retain all we attempt to tell him. But we do believe that he will gain a better understanding of his place in the Army, and of his own particular task in the Army; and will have some foundation on which to build his future knowledge, from the five weeks spent at the Training Centre.

Considerable thought has been and is being given to more special training after the five weeks' course has been completed, and the medical officer has qualified for his captaincy. It has

been suggested that a short course be given in resuscitation just before he leaves for a theatre of war. Included under this subject would be instruction in the use of dried blood, not from a hospital practice point of view, but from that of the medical officer working well forward in the F.D.S. and Field Ambulances and at the Regimental Aid Post. It would be an intensely practical course.

Apart from such instruction in the treatment shock, one might teach some practical emergency surgery; perhaps some time might be well spent in dealing with the emergency treatment of head injuries. Anaesthesia in the field could also be considered. It is felt that if, as, and when, such a short course, intensely practical, is introduced, it will go a long way toward building up the confidence of younger and less experienced officers.

At the present time, when an officer has finished his qualifying course he is sent out to gain practical experience under selected senior officers. Some are sent to take special courses in x-ray, anaesthesia, neurosurgery or psychiatry, or in some other specialty. Those selected are usually officers who have had previous experience in a particular subject.

Generally speaking, the methods of training our medical officers are improving constantly. Some difficulty is being found in obtaining experienced instructors, but, with more returning from overseas, that problem will be overcome.

Camp Borden, Ont.

used any more extensively than seemed absolutely necessary.

In the *Bulletin de la Société Belge d'Ophthalmologie*, March, 1940, Coppez reported in detail an apparently hopeless case of sympathetic ophthalmia in which, after the usual methods had been ineffectual, the free use of atophanyl intravenously resulted in an eye which at the time of the report had been free from inflammation for one year, had vision of 5/10 and full field. He based his treatment on that of Buckler who reported in the *Klinische Monatsblätter*, 1936, a series of ten cases with eight cures, a case being considered cured which had retained useful vision and remained free from inflammation for one year. He used atophanyl very freely—25, 45, 56, and even 77 injections in a case. A search of the literature disclosed scant reference to this drug in diseases of the eye. Gifford mentions it only to warn against its use where liver function is imperfect.

Coppez also claimed benefit from the use of the "abscès fixé" produced by the injection in the flank between the superficial tissues and the muscle of 1.5 cm. of purified oil of turpentine and advises following the French practice of not incising the abscess when it forms. Van Lint also recommended the "abscès fixé" in inflammatory diseases of the eye.

J.G., aged 19, miner, was admitted to the Vancouver General Hospital, April 19, 1942, with a history of having been struck on the left eye by a small foreign body while at work late in December, 1941. The injury was considered trivial, but, after several recurrences of inflammation, one month later he was referred to Dr. Laishley, of Nelson, B.C., who, after localizing an intraocular foreign body, removed it by magnet extraction. Later it was necessary to attempt the extraction of the cataract. The eye did not respond well and enucleation was advised. This the patient refused and was sent to Vancouver for further advice.

On examination the case presented a typical sympathetic ophthalmia. The sightless left eye was enucleated and with sulfadiazine the right eye improved so much that we had hope that our diagnosis was incorrect. It proved to be only a lull before the storm and subsequent use of the sulpha drugs produced no positive benefits. The inflammation assumed a most violent form, with remissions and exacerbations, and in the latter atophanyl was used with beneficial effects on the inflammation and pain. It was given only 13 times; it would have been used more freely had it been deemed imperative.

The patient had a complete examination, including teeth, tonsils, sinuses, prostate, and chest. X-ray of the latter was clear, but the Mantoux test was positive. Infected teeth and tonsils were removed; the nasal sinuses explored. Practically every known form of treatment was given except diphtheria antitoxin, a previous experience with which in another case seen in consultation had not proved favourable.

Although the case could certainly be classed as very severe, with exudate and "mutton fat" deposits, a good pupil was maintained by the free use of atropin

Case Reports

ATOPHANYL IN THE TREATMENT OF SYMPATHETIC OPHTHALMIA

By Colin Graham, M.D.

Vancouver

The chief purpose in reporting this case is to draw to the attention of medical officers of the armed forces a useful addition to our methods of combating the most dreaded disaster in injuries of the eye, sympathetic ophthalmia. It is not claimed that the fortunate outcome of this case was due solely to the use of atophanyl, but its exhibition seemed to be decidedly beneficial; it controlled violent phases of inflammation, but, for fear of liver damage, it was not

or scopolamine and immediately combating a contracting pupil by the "coup-sur-coup" method. As it seems there are a good many ophthalmologists who are not familiar with this most valuable treatment it might be described as the alternate instillation of 4% atropin and 4% cocaine five minutes apart until four doses of each have been given, the puncta being carefully occluded by finger pressure after each instillation.

On discharge from the hospital July 20, 1942, the eye was practically white, with a few small posterior synechiae. The slit lamp showed only old deposits on the posterior surface of the cornea and the dilated iris vessels were much decreased, the fundus normal, vision with correction normal. Tuberculin injections were continued for several months by Dr. Laishley, the eye remaining free from inflammation. A recent letter from the patient states that his vision is good, but he does not think it is quite perfect.

THE USE OF A CONTACT LENS TO IMPROVE VISION IN A SERIOUSLY INJURED EYE

By L. Kazdan, M.B.

Toronto

The following case may be of interest in view of similar injuries which may result from war or from accidents generally.

Patient D.S., aged 32, was in a car accident in 1931. Both eyes were seriously injured. The left eye was enucleated immediately. The right eye was ruptured in its upper portion through

the cornea and sclera. The iris was completely extruded. The lens was injured. No infection occurred and the eye healed.

When I saw the patient in 1939, he wore a pin-hole disc with a small plus ten lens behind it. This gave him the vision of about 20/50. His visual field was, of course, very narrow through the pin-hole and getting about was difficult. The eye showed a healed scar in the upper part of the cornea extending into the sclera. There was no iris. There was a secondary cataract varying in thickness and density and preventing a clear view of the interior of the eye.

I performed a needling, making a fair sized aperture through the membrane. Several weeks later, I made a cast from the eye and a contact lens was made in which was incorporated a plus ten correction to compensate for the aphakia. The corneal portion of the contact lens around the pupil was painted black to take the place of the absent iris, thus preventing excess entry of light into the eye and dazzling. By this means the vision in his eye was restored to 100% normal with a full visual field. With short intervals of rest, he wears the lens all day. For the past three years he has been able to drive his car and is carrying on in a normal manner.

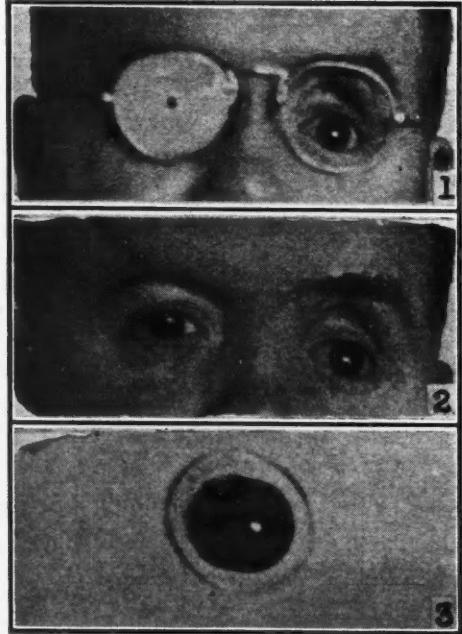


Fig. 1.—Showing spectacles with pin-hole disc over his only eye worn by patient for about 8 years, previous to being corrected with contact lens. The left eye is an artificial one. **Fig. 2.**—Showing right eye with contact lens on. **Fig. 3.**—Shows specially made contact lens with corneal portion about pupil painted black to take the place of the absent iris. It incorporates the necessary optical correction to give the patient normal vision.

Special Article

CANADA'S FIRST NATIONAL VENEREAL DISEASE CONTROL CONFERENCE

By Lt.-Colonel D. H. Williams, R.C.A.M.C.

Chief of Division of Venereal Disease Control,
Ottawa

The seriousness of the venereal disease situation in Canada has recently aroused the general interest of the public and their governing agencies. The need was recognized by all for the earliest implementation of action to reduce the threat of venereal infection to Canada's war effort and to Canada's home life. On July 1, 1943, a comprehensive control program was launched. This effort, initiated by the Army, integrated the control measures of the Navy, Air Force, Department of Pensions and National Health, and Provincial Health Departments.

Appreciative of the importance of co-ordinating and unifying the control measures of all interested agencies in Canada, the Minister of Pensions and National Health called a National Venereal Disease Control Conference in Ottawa,

December 6 to 9. At this meeting 105 delegates and visitors assembled. They represented the Canadian Army Overseas, the Armed Forces in Canada, the Federal and Provincial Departments of Health, University Departments of Preventive Medicine, the National Research Council, the Canadian Medical Association, the Canadian Hospital Council, the Health League of Canada, representatives of the Navy, Army, Air Force, Ministry of Health and Medical Research Council of Great Britain, and representatives of the Army, Navy, Air Corps, Public Health Service, National Research Council and American Social Hygiene Association of the United States.

The purpose of the conference was to consider how best the existing administrative facilities for the prevention of venereal disease could be utilized in Canada; and what need existed for modification and extension of these facilities. As a result of the deliberations of the conference guided by the wisdom and experience of visitors from the United Kingdom and the United States, the basis of a National Venereal Disease Control Program was laid down. Principles and policy which would guide this program were approved. Definite specific types of preventive action and the spheres within which this action was to be taken, were determined.

FOUR SECTOR FRONT

Adoption of a charter to guide the Canadian venereal disease control effort on a comprehensive basis was given. This charter interpreted Canada's response to the threat of venereal infection as envisaging a four-sector Canadian front against venereal disease. These are the Health, Welfare, Legal and Moral sectors—components of an indivisible whole aligned against a common foe. The ultimate objective is to destroy syphilis and gonorrhœa. The purpose is to take the offensive on each sector with the weapons peculiar to its own method of attack. Waging unrelenting war on the Health sector with weapons of modern medical science and public health procedure, will be physicians, nurses and Health Departments. Leading the attack on the Welfare sector will be found social workers and welfare agencies armed to battle squalor, overcrowding, lack of food, neglect and insecurity. Directing a vigorous action on the Legal sector will be the courts, the legal profession and police agencies whose action seeks out and brings to justice those who for personal gain purvey to men's weaknesses. On the Moral sector the battle is to be led by the churches and homes of Canada, strengthening the moral fibre of our nation and upholding the sanctity of marriage and family life. Each sector has its own territories, its own personnel and armaments. The ultimate objective is the same.

SIX-POINT HEALTH SECTOR STRATEGY

A six-point strategy on the health sector was adopted by the National Conference.

1. *Health education.*—The facts concerning venereal disease will end the conspiracy of silence, banish outworn fallacies, and remove false fears. Lectures, motion pictures, posters and pamphlets will tell the story of how the disease may be vanquished.

2. *Medical care.*—Every Canadian who requires examination and treatment should have the best that medical science can provide. Free blood tests, free drugs, and free clinics are being provided by Health Departments. It is cheaper to cure and prevent venereal disease than to pay taxes for the end-results of neglected infection.

3. *Abolition of quackery.*—Laws exist in Canada to protect citizens from the quack and charlatan. Only qualified physicians are permitted by law to care for those suffering from venereal disease. The public must be protected from the incompetent and the rogue.

4. *Prenatal blood tests.*—Every expectant mother must have a blood test for syphilis before the fifth month. Demand it! Insist upon it! It is the only protection many unborn children have.

5. *Premarital blood tests.*—Health examinations, including blood tests, are a safeguard against the sinister encroachment of syphilis on home and family life.

6. *Contact investigation.*—Careful search must be made for all who have been contacts to known venereal disease. Only by seeking these people and by bringing them under medical supervision can the extending network of venereal disease be destroyed.

Today as never before, events and conditions are favourable for the final eradication of the venereal diseases in Canada. The urgency of removing this threat to the health and efficiency of the armed forces is recognized by all. There is a full tide of wholesome public interest, concern and support for measures directed against these master saboteurs of war effort. Never before has there been such an imposing show of force representing all the available human resources arrayed against the serious threat of syphilis and gonorrhœa.

If every citizen in Canada takes his station on the Health, Welfare, Legal or Moral sector of Canada's four-sector front against venereal disease, the favourable outcome of the battle is assured.

HYPERTROPHIC AXILLE.—Dr. D. M. Macdonald (Arnsdorf) writes: Should the treatment suggested under the above heading in the Journal of October 2 (p. 440) fail, an almost certain remedy will be found in the use of the constant current (20 milliamperes) twice a week for from ten to twenty minutes. The negative pole is applied to the affected area.—*Brit. M. J.*, 1943, 2: 502.

Clinical and Laboratory Notes

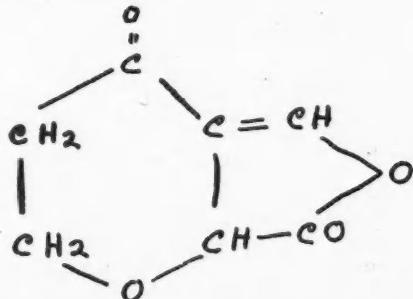
PATULIN

By E. M. Boyd

Kingston, Ont.

Once upon a time gasoline was a nuisance and the problem was how to get rid of it; once upon a time moulds were a nuisance and the problem was how to get rid of them. Not so today. Since the epoch-making purification of penicillin from the mould *Penicillium notatum* by Florey and his associates at Oxford University in 1940, the search for therapeutic agents from moulds has crossed oceans and continents. At the London School of Hygiene and Tropical Medicine in London, England, Professor Harold Raistrick and his associates in the Department of Biochemistry have assiduously isolated, purified and established the structure of a number of therapeutically active compounds from various moulds. Their most recent and most interesting derivative from moulds is "patulin" which is obtained from the mould, *Penicillium patulum Bainier*, and which holds promise of therapeutic activity against the common cold.

Patulin has been shown¹ to be a relatively simple organic compound with the following structure:



It is a colourless, crystalline material, soluble in most of the common solvents, stable in solution at pH 6, and produced in quantities up to 1% or more of the mother liquor of mould cultures. Some patulin happened to be sent to Dr. W. E. Gye, Director of the Imperial Cancer Research Fund Laboratories, and Dr. Gye happened to have a severe cold when he received it so that he thought that a nasal douche of patulin might help his cold. The result of his using it was so dramatic² and beneficial that he tried it upon his colleagues and others with similar encouraging results. The co-operation of Surgeon-Commander W. A. Hopkins, of the Royal Navy, was then obtained for a more extensive trial of patulin against the common cold and Dr. Hopkins reported³ that patulin was effectively bacteriostatic against both Gram-positive and Gram-negative organisms *in vitro*, and when given as a nose and throat spray at concentrations of from 1 in 20,000 to 1 in 5,000

in a suitable vehicle every 4 hours to some 100 patients, it increased the 48-hour recoveries by from 4 to 20 fold over that of an approximately equal number of patients who received a "blind test" or placebo of the vehicle only.

The drug is stated to act within an hour or so with symptomatic relief, which suggests that it may have decongestive and perhaps local anaesthetic properties, although these pharmacological actions have not yet been studied. A concentration of 1 in 2,000 inhibits the phagocytic activity of leucocytes and the drug is locally toxic when injected; this, together with the fact that in lethal doses it causes increased capillary permeability with oedema and haemorrhage of the lungs, liver, spleen, kidneys and brain, indicates that patulin is to be used with some respect and caution. It has also been reported that in another investigation done elsewhere patulin has not been found to be as effective a remedy as would be deduced from the above.⁴ It has been reported to be ineffective against influenza.³

Meanwhile the drug is not to be issued for general sale but will be supplied by the Therapeutic Research Corporation of Great Britain for further research and study of its pharmacological, toxicological and therapeutic properties.

REFERENCES

1. BIRKINSHAW, J. H., BRACKEN, A., MICHAEL, S. E. AND RAISTRICK, H.: *The Lancet*, 1943, 245: 625.
2. GYE, W. E.: *The Lancet*, 1943, 245: 630.
3. HOPKINS, W. A.: *The Lancet*, 1943, 245: 631.
4. Editorial: *The Lancet*, 1943, 245: 641.

A plea that the Ministry of Food—greatly reduced in personnel and in the extent of its influence—should be perpetuated after the war has been made by Lord Bledisloe, who considers that this step would be in the highest national interest. He believes that no Government Department has, through courage, vision, impartiality, and sound scientific guidance, contributed more largely to the health, contentment, and confidence of all classes of the community during an unprecedented emergency. Lord Bledisloe suggests that after the war the Minister of Food, a man wholly independent of the votes of constituents, should have as his sole objective the organization and equitable distribution of the nation's food supply, whether raised in this country or oversea, with due regard to the adequate nutrition, optimum physical welfare, and capacity for work of all its inhabitants. He would also tend to hold the balance in the matter of food between the claims of the rural community (not always based on outstanding vocational efficiency) and those (often sadly short-sighted) of our preponderant urban populations. Without a post-war Ministry of Food it might prove impossible for this country to play its full part in implementing the findings of the Hot Springs conference.—*J. Roy. Inst. Pub. Health & Hygiene*, 1943, 6: 245.

Editorials

THE HEALTH INSURANCE PLANNING COMMITTEE, R.C.A.M.C. (OVERSEAS) SENDS A REPRESENTATIVE TO CANADA

THE unremitting attention devoted by our Association to the subject of health insurance in Canada has taken due account of the interests of our confrères on active service overseas. At the Jasper Park meeting in 1942 it was decided to send periodically to all Canadian medical men overseas a special Bulletin to keep them informed of developments in the field of Health Insurance in Canada. At the same time these men were asked to send back to us their own views on the subject.

The exigencies of war served to delay the distribution of informative material sent overseas, but, fortunately, this has now been remedied, by the D.M.S. Overseas with the invaluable assistance of the Director General of Medical Services and of Brig. J. C. Meakins. It was felt, however, that the liaison with the men on active service could be still further strengthened and opinions be more directly expressed if some representative could bring back to Canada the views of the overseas group. This has now been arranged in the person of Lieut.-Colonel E. H. Botterell, who has returned on a special mission. His visit is largely the outcome of the formation in England of a special Health Insurance Planning Committee of the R.C.A.M.C. (Overseas), which has a full representation of the Army medical personnel overseas. This Committee has within the last eight months carried on a great deal of very careful study on health insurance, and has stimulated a high degree of interest in it amongst medical officers. As a result of its work a composite report was prepared and entrusted to Colonel Botterell for presentation to our Association.

The significance of such an occasion was fully recognized and a special meeting of the Executive Committee was called to meet Colonel Botterell and receive this report of the views of our confrères overseas. The report is not yet available for publication,

but there are certain general features which may be dealt with. In the first place, the Overseas Planning Committee expresses its confidence in the Canadian Medical Association as its representative "in all matters pertaining to health insurance, public health, the prevention and treatment of disease, research and other matters related thereto"; and general agreement was expressed in regard to the Twenty Principles laid down by the Association.

The consideration to which most attention was paid in preparing these recommendations was the provision of the highest form of medical service for all the Canadian people. Naturally, there is only a limited opportunity for men on active service to go into detail in the carrying-out of such a far-reaching plan, but the feeling was strongly and definitely expressed by the Planning Committee that such a scheme should be compulsory for the whole population and should be under Federal control. The legislative difficulties involved in this were fully recognized.

Other points dealt with were as follows. The establishment of Health Centres where circumstances indicated was regarded as being important in linking up medical practice. Rehabilitation services of a therapeutic nature were felt to be an essential part of a comprehensive health service. The co-ordination of preventive and therapeutic medicine should be striven for. The financial support of research should be extended to *all* branches of medical science. Finally, it was a corollary to the provision of an efficient and comprehensive health service that the standards of medical education should be not only maintained but steadily improved.

The Executive Committee was most favourably impressed with the scope and tenor of this report from overseas. We know now that our colleagues are thinking along the lines which we are following, and have the same views and ideals with respect to our national health. In no respect do these more closely harmonize with ours than in desiring the best type of medical service

under equitable professional working conditions.

It may be added that the authorities of the armed forces in Canada have recognized the importance of these issues to medical men, and suggestions have been made to the administrative officers concerned that everything possible is to be done to stimulate interest amongst their medical personnel and to provide information on the whole field of Health Insurance.

THE C.C.F. AND THE MEDICAL PROFESSION

OUR Association has no political bias and is not directly concerned with politics. At the same time the present-day trend towards legislative intervention in the conditions of medical practice makes it imperative that both individually and as a group we should follow very closely the various plans being evolved. We are not dealing at the moment with the legislation now under consideration by the Government, but would draw attention to the views of one of the political parties, that is, the C.C.F., on the conditions with which the medical profession would have to conform if that party came into power. These views have been stated for us by Mr. E. B. Jolliffe, leader of the C.C.F. party in Ontario in an address before the London Academy of Medicine, and whilst at the moment they are no more than views, we should recognize their potential significance.*

According to Mr. Jolliffe, the C.C.F. party plans to socialize not only industry but the professional groups: incidentally he was very vague in reply to a question as to whether the legal profession would be included in this process. Mr. Jolliffe spoke with complete frankness as to the change that the medical profession would have to face under a C.C.F. régime. A system of "socialized medicine" would be introduced, but our fears of this as being only a thinly veiled form of state medicine are to be allayed by the consideration that it would be democratically controlled. A strong point was made of the fact that there would be less and less of central control, *but more and more of local control.*

* See epitome of Mr. Jolliffe's address on page 162.

Perhaps the most striking feature of the C.C.F. program is the readiness with which it is expected to solve problems which seem to us to present great difficulties. One can understand that many of these would vanish if such a clean sweep of existing methods was made as is envisioned, but not otherwise. On two separate occasions Mr. Jolliffe made it clear that the so-called rugged individualist, a phrase in frequent use by the party, would receive little consideration. It should be added however that he did not anticipate that the C.C.F. program would be instituted as a whole very speedily. In Ontario, for example, Mr. Jolliffe felt that "we shall never be in the position to establish a completely socialized Provincial economy; that must await national development and a national process of socialization."

Mr. Jolliffe went out of his way to insist that working conditions for doctors would be greatly improved under the C.C.F. planning. They would no longer be subject to call at any hour of the day or night. He was also a strong advocate of arrangements for post-graduate work and for research. Unnecessary patent medicines would be abolished. The "irregulars" would be scrutinized by scientifically minded men whose decision as to their standing would be final.

One could find nothing to mar the rosy picture except the deceptive ease with which everything was to be done. Until more convincing arguments are put forward however, we cannot feel that the problems of medical services for the country are going to be so easily solved. There is nothing to show that the medical care of the people would be improved under government control, and we can extract no more than a pious hope that under such a plan medical working conditions would be ameliorated, if indeed they were even maintained as at present.

A poet is a nightingale, who sits in darkness and sings to cheer its own solitude with sweet sounds; his auditors are as men entranced by the melody of an unseen musician, who feel that they are moved and softened, yet know not whence or why.—*Defence of Poetry*, P. B. Shelley.

Editorial Comments

Good Living Conditions and their Relation to Health

The dependence of health on good living conditions is a fact not to be denied, and yet one whose implications continually need re-statement. This has been well done by Dr. Menzies in his paper on "Preventive Medicine" in the present issue. His paper, short as it is, deals with fundamental issues in the health of rural communities and shows that he has fully grasped the wider responsibilities of the medical practitioner. These responsibilities must of necessity be largely borne by the technical agencies, such as sanitary engineers, etc., but the general practitioner should never be completely excluded from co-operating and advising. That should be remembered wherever public health measures are concerned.

We would also draw attention to a paper by Professor J. A. Ryle (*British Medical Journal*, November 20, 1943) in which he deals with this same relationship between health and living conditions, conjoining the two under the head of social medicine. The essence of social medicine is the application of medicine "to the service of man as *socius*, as fellow or comrade", as well as "to the service of *societas* or the community of men". Professor Ryle traces the tendency in the teaching of clinical medicine to pass by the more general aspects of the origins of disease in pursuit of the more narrowly directed aims, however valuable, in diagnosis and treatment. "The sciences and techniques have come to dominate medicine to the exclusion of the most important science of all—the science of man—and the most important techniques of all—the technique of understanding". Along with this however there has been the development of preventive medicine, which has done so much and in the field of nutrition is doing so much at the moment. He describes the slowing down, or at any rate the failure to advance in the attack on chronic disease, infectious and otherwise. And here he reaches the same point as does Dr. Menzies in showing what an enormous and immediate advance in the control of disease would result from improved feeding, good housing, better education and cultural opportunities and social security.

Professor Ryle makes no plea for medical or any other polities. To him medicine has no function in the advocacy of reorganization of medical services. It should only influence these changes by supplying the necessary knowledge of what is to be done. It may be said, as he points out, that many of the social evils so widely manifest by disease call not for medical action but for drastic social and economic reform. The electorate is to be responsible for these. But the collection of the evidence of the association between disease and poor social

conditions, or better still, of the value of good social conditions in prevention of disease, must be the duty of the profession.

The lesson is clear, that so long as there is no definite improvement in living conditions public health will make no more than a partial and inadequate advance.

Quinine Donations

The response to the appeal from the Controller of Chemicals for supplies of quinine has been very satisfactory so far. We are informed that up to the end of 1943 more than 5,500 oz. of quinine have been donated to the Quinine Pool. These gifts of the drug have come from more than 900 sources, including dealers, doctors, manufacturers, wholesalers and private individuals. One company gave as much as 600 oz. and gifts have come in from places as far north as the Yukon. At the same time some druggists have expressed the opinion that turning in of large stocks of quinine involves a considerable financial loss, and the suggestion has been made that credit might be given for what is turned in and that either cash payments be made or that the same amount of quinine be returned to the donors when supplies again became available.

We are informed that the Government purchased 85% of the supplies available in 1943 from wholesalers.

It is hoped that even more of the drug will be forthcoming, as the need is still acute.

Medical Economics

THE C.C.F. AND HEALTH SERVICE

Amongst the various statements from the C.C.F. party with regard to their proposed policies, we may quote the main points of a speech by Mr. Jolliffe on the views of that party with reference to a Health Plan for Canada.

In general the aim is to introduce a system of socialized medicine. The party believes in the social ownership of the means of production, in the democratic control of industry from top to bottom, and so in the democratic organization of the professional services. That is where the medical profession is involved.

After comparing national health insurance as exemplified in Germany, with state medicine as exemplified in Russia, and finding that German medical men are in a deplorable state, and the Russian doctors have more privileges than doctors in any other country, Mr. Jolliffe went on to hold out prospects of raising the position of the medical profession in Canada. Evidently he has no idea of any rapid changes. "In the Province of Ontario, of course," he said, "we shall never be in a position to establish a com-

pletely socialized Provincial economy; that must await national development . . . but we do intend to go as far as possible in the socialization of medicine."

He referred then to the acknowledged deficiencies in present health services, taking as what he felt to be comparable the health insurance system in force in England. He showed that under that system the provision and distribution of medical services were criticized: wage earners only were allowed the benefits; consultant, specialist and institutional services were not included; economic status rather than medical need was too often the criterion of eligibility for medical service: distribution of doctors was unequal especially as regards specialists.

The general practitioner too had his grievance in not receiving the co-operation of statutory bodies and hospitals. His conditions of work were too exacting, interfering both with post-graduate work and proper holidays. Too often there were heavy financial burdens arising from the initial outlay for establishing practice.

It is the aim of the C.C.F. to prevent such conditions from arising in Canada, or to remedy such deficiencies as exist here. Their resolution on health services reads as follows:

"Satisfactory health service should provide all citizens with complete preventive as well as remedial services to all ages, and should be so designed that the major emphasis is the achievement of positive health rather than the simple absence of obvious disease; further, it should ensure to all personnel of health services opportunity and facilities for maximum improvement of their knowledge and skill under conditions of practice which allow sufficient leisure for recreation and study, and adequate remuneration and security."

It is the hope of the C.C.F.:

"That our scheme will be such that it will open many advantages to the average medical practitioner, and that under our scheme the status and influence of the medical profession will be improved, or increased rather than diminished. We intend to avoid the mistakes made in many health insurance schemes, of simply instituting a system of payment for physicians, which in most instances was inadequate, and whose administration burdened the physician with many irritating restrictions."

Mr. Jolliffe felt that an obvious weakness of health insurance as forecast for Canada is that it does not provide better or more facilities for training doctors, or providing the country with more doctors as needed.

The C.C.F. plan is a modified combination of the organization in Russia and that recommended by the Medical Planning Commission of the B.M.A. Health centres are to be established in which general practitioners for a given area would work, possibly along with consultants as specialists. There would be 12 practitioners to serve about 10,000 people, and there would be hospital affiliations with each group, as well as public health departments.

"The staff of the centre would be assured of reasonable hours of work, security against sickness and accident, pensions on retirement and definite times off for holidays and postgraduate work. All unnecessary house calls will have to be eliminated, and arrangements for office consultations will have to be encouraged to as great an extent as possible."

Choice of practitioner would be allowed to each family, but no doctor would be allowed to have more people to look after than he could reasonably manage. Specialists would be members of the staffs of hospitals. All hospitals would be under the control of the professional health commission. Patients in hospital would be in charge of members of the hospital staff, but these would be in close consultation with the family practitioner and there would be no intention to exclude him when his patient was admitted. Convalescent hospitals would be paid special attention and sanatoria would be maintained.

METHODS OF PAYMENT

It is proposed that payment for medical services should come from consolidated revenue fund, not from special collections for the purpose. All payments would be by salary, but, said Mr. Jolliffe, "we don't expect that that will be feasible for some time to come, probably for a long time to come". For the present, capitation fee combined with basic salary would probably be the solution.

ADMINISTRATION

Mr. Jolliffe spoke of two aspects: (a) general; (b) technical. The first which would deal with matters of policy such as the amount the country would spend, the amount of authority to be given for enforcing public health measures, and so on, would be administered by a democratic representative body on which the professional personnel of the health services would be represented and members appointed by various representative groups.

The technical aspect would be entirely under the control of the professional staff, which would determine the standards of medical services, the distribution of doctors and hospitals, etc. This staff should be appointed by the professional association.

Mr. Jolliffe then dwelt on the importance of providing more facilities for medical education, including research and postgraduate work. The cost of all this would be high but he considered it would be a good investment.

In answer to the question, could the country pay for such a large and expensive scheme, the reply was that "we can afford to do anything that we can afford physically to do".

Many other questions were replied to. Mr. Jolliffe would stop needless advertising and the manufacture and sale of all useless patent medicines. He felt that the system suggested would provide for better working conditions for medical men, and would eliminate over-work and the evil of being on duty at all hours. (He did

not answer the inquiry as to how it could be arranged that babies should be born only during daylight hours!) The allotment of doctors to the health centres envisioned by the C.C.F. scheme would be left largely to the medical profession.

Administrative bodies would have to live up to the standards set by the Provincial health commission. The government would appoint the members of the general administrative staff. Local control rather than central was to be aimed at.

As regards the "irregulars", a commission would be appointed to investigate their claims. The commission would be composed of men of scientific training, and Mr. Jolliffe said he had a fairly good suspicion of what their decision would be.

Health insurance would cover the entire population. Disability payments are proposed but are not yet defined.

It was asked, what would happen if a doctor refused to go to the area to which he was allotted. The reply was that men entering the profession would be financed through their course, and if they did not comply with the conditions on which they took their course they "just wouldn't be eligible to be licensed to practise", and there would be no appeal from that decision.

THE AMERICAN MEDICAL ASSOCIATION AND COMPULSORY HEALTH INSURANCE

[The following statement by the Council of Medical Service and Public Relations of the American Medical Association clearly defines the position of that Association with respect to compulsory health insurance. It appeared in the "Journal of the American Medical Association", November 6, 1943.—EDITOR.]

A STATEMENT OF GENERAL POLICIES

Pursuant to carrying out the duties imposed on it by the House of Delegates, the Council has adopted the following general policies.

1. The Council on Medical Service and Public Relations recognizes the desirability of widespread distribution of the benefits of medical science; it encourages evolution in the methods of administering medical care, subject to the basic principles necessary to the maintenance of scientific standards and the quality of the service rendered.

It is not in the public interest that the removal of economic barriers to medical service should be utilized as a subterfuge to overturn the whole order of medical practice. Removal of economic barriers should be an object in itself.

It is in the public interest that the standards of medical education be constantly raised, that medical research be constantly increased and that graduate and postgraduate medical education be energetically developed. Curative medicine, preventive medicine, public health medi-

eine, research medicine and medical education all are indispensable factors in promoting the health, comfort and happiness of the nation.

2. The Council through its executive committee and secretary shall analyze proposed legislation affecting medical service. Its officers are instructed to provide advice to the various state medical organizations as well as to legislative committees concerning the effects of the proposed legislation. It shall likewise be the duty of its officers to offer constructive suggestions to bureaus and legislative committees on the subject of medical service.

3. The Council approves the principle of voluntary hospital insurance programs but disapproves the inclusion of medical services in those contracts for the reasons adopted by the House of Delegates at the 1943 meeting.

4. The Council approves voluntary prepayment medical service under the control of state and county medical societies in accordance with the principles adopted by the House of Delegates in 1938. The medical profession has always been strongly opposed to compulsory health insurance because (1) it does not reach the unemployed class; (2) it results in a bureaucratic control of medicine and interposes a third party between the physician and the patient; (3) it results in mass medicine which is neither art nor science; (4) it is inordinately expensive and (5) regulations, red tape and interference render good medical care impossible. Propaganda to the contrary notwithstanding, organized medicine in general, and the American Medical Association in particular, have never opposed group medicine prepayment or group medical practice as such. The American Medical Association and the medical profession as a whole have opposed any scheme which on the face of it renders good medical care impossible. That group medicine has not been opposed as such is evidenced by the fact that there are many groups operating in the United States which have the approval of the medical profession, and members of these groups are and have been officials in the national and state medical organizations. That group medicine is the Utopia for the whole population, however, is not probable. It may be and possibly is the answer for certain communities and certain industrial groups if the medical groups are so organized and operated as to deliver good medical care.

5. The Council believes that many emergency measures now in force should cease following the end of hostilities.

6. The Council believes that the medical profession should attempt to establish the most cordial relationships possible with allied professions.

7. There is no official affiliation between the American Medical Association and the National Physicians' Committee. However, since it is the purpose of the National Physicians' Committee to enlighten the public concerning contributions

which American medicine has made and is making in behalf of the individual and the nation as a whole, it is the opinion of the Council that the medical profession may well support the activities of the National Physicians' Committee and other organizations of like aims.

8. American medicine and this Council owe a responsibility to our colleagues who are making personal sacrifices to answer the call of the armed forces. Therefore the Council expresses the desire to co-operate with the medical committee on postwar planning in order to assist our colleagues in re-establishing themselves in the practice of medicine and in the preservation of the American system of medicine.

Retrospect

THE MANAGEMENT OF WOUNDS (A Retrospect)

By J. R. LaCroix, M.D., C.M.
Montreal

During the past quarter century there have been great changes in the management of wounds, but these have not resulted from the discovery of any new fundamental surgical principles. The important early pages of our textbooks still maintain their chapters on repair unaltered. Improvements have been possible because established principles which were being neglected have been "rediscovered".

Healing of a wound, or of any other lesion whose nature is to heal, depends on three conditions: (1) Rest, local and general; (2) Adequate blood supply; (3) Control of infection.

If these three factors are present, combined with normal health and nutrition, then any wound—fracture, laceration, gunshot or any other kind—will *always* heal. When one of them is absent healing will *always* fail. Unless they are primarily considered in respect to each wound which comes under a surgeon's care none of his special skill or knowledge will avail anything. We shall see how these principles are being respected or neglected in the modern practice of traumatic surgery.

EXCISION AND DÉBRIDEMENT

These procedures are concerned with *control of infection*. Every wound is a contaminated wound, even one produced in the operating theatre by aseptic surgical procedures. In the latter, contamination is small enough to be overcome by the ordinary immunological powers of the tissues, and suppuration only occasionally occurs. Accidental or war wounds are much more heavily contaminated, even if they look clean, and in these there is a second important

cause of infection—devitalized tissues which have lost their power of destroying bacteria and have become an excellent culture medium.

Wounds fall into two main groups, infected and uninfected, but for the first few hours all wounds remain merely contaminated. They become infected when invasion of the tissues by multiplying micro-organisms becomes clinically significant. This occurs, although it does not yet become apparent, some time within the first twenty-four hours, usually between eight and sixteen hours. There is no clinical difference between an infected and a non-infected wound until the process of suppuration begins in the former, with frank pus appearing usually on the fifth day unless healing by resolution occurs. In the early stages the division into infected and non-infected is purely arbitrary and is based on the results of experience. We know that almost all wounds excised within eight hours heal without sepsis, while almost all wounds untreated during the first twenty-four hours suppurate. Between eight and twenty-four hours there is a no-man's-land where the patient's chances deteriorate from almost certain healing to almost certain sepsis.

There is a clear-cut distinction between the management of uninfected wounds and the management of infected wounds. The former are treated by excision and primary closure, the latter by débridement. Excision and débridement, and the difference between them will be discussed in a moment. First, we must consider the standard by which a wound may be classified as uninfected. In Barcelona, Trueta dealt with casualties resulting from comparatively short, frequent air raids and saw most of his cases of wounded civilians within a few minutes. He regarded two hours as the safe limit for wound excision. For cases delayed longer than six hours he usually preferred a process of débridement which left an open wound. In Britain the air raids typically lasted all night and the gathering-up of the wounded was considerably delayed. Therefore, British surgeons were tempted to bolder methods and obtained very good results with primary closure of wounds up to eight hours after infection. Even between twelve and twenty-four hours some cases healed without sepsis, although little reliance was put on the method after eight hours. Russian surgeons have carried the practice of excision to the utmost extreme. Mr. Watson-Jones, who recently visited Russia with the group of British, Canadian and American surgeons, reports that "A large excision of all injured and all contused tissues is recommended no matter how many hours or days have elapsed since wounding, and independently of the presence or degree of infection." He remained unconvinced that such extreme measures are best. In late cases dissemination of infection is too common if excision is done, and anyone who regularly performs it after an eight

or at the most a twelve-hour limit must be prepared for many failures.

EXCISION

Wound excision is a process of *conversion* by which a wound is rendered surgically clean, or aseptic. Not every germ can be removed, but so few are left that infection does not occur. The surgeon has two purposes—first to remove the exposed surfaces within the wound, which bear the contamination, and secondly, to remove all tissues which have lost part or all of their vitality. *Efficient excision will prevent suppuration.* It is not a hit or miss procedure but is absolutely reliable. The percentage of failures is so small as to be negligible, and the surgeon who has even occasional failures in early cases must question his methods. An undue amount of destruction may seem to be demanded of the scalpel, but there is reassurance in the certain knowledge that however great the damage wrought by the scalpel the damage of ensuing sepsis would be incomparably greater.

The skin edge is removed except in wounds of the face and scalp. All visible adipose tissue is removed because of its poor blood supply. Fascia can be left because of its great viability unless it is in shreds or impregnated with visible contamination. Damaged muscle is the most dangerous content of a wound. Only here does gas gangrene flourish. All suspect muscle must be seen, even at the cost of freely extending the skin incisions, and what is devitalized must be removed, no matter how much of it is found. At least the remaining muscles and their related joints will retain their function if sepsis is avoided. Perfect haemostasis is essential, but as few ligatures as possible should be used, and fine silk or linen is to be preferred to catgut.

When excision is complete the wound may be repaired in the same way as a surgically produced wound would be. Usually, all that is required is to close the skin. Empty spaces are better eliminated by firm bandaging than by placing internal sutures.

It is proper to close a wound which has been adequately excised. Without primary closure healing is sacrificed and the whole purpose of thorough excision is lost. If the wound is to be left open, healing by secondary intention is *ipso facto* accepted, so there is no indication to do a radical excision. All that is required is sufficient opening up for adequate drainage—and this is the procedure of débridement.

Often skin is lacking to cover the wound which has been excised. There should be no hesitation in making relieving incisions so that neighbouring skin can be moved over to effect the closure. In general it is better to skin-graft the relieving incision than to lay the grafts over the wound itself which has a less even surface and bears more contamination.

DÉBRIDEMENT

Wounds which are suppurating or are expected to suppurate are treated by débridement, which is quite the opposite of wound excision, although the two terms are often used synonymously in a fuzzy-minded manner. The purpose of excision, as we have seen, is to remove contamination and to remove devitalized tissues. The purpose of débridement is to provide efficient drainage. The skin opening is enlarged to achieve "saucerization" so that the deeper portions of the wound will be sure to heal before the skin comes together. Foreign bodies, blood clots, masses of dead tissue, and avascular bone fragments are removed. There is no question here of "decontaminating" the wound. All living tissue should be as little disturbed as possible and the inflammatory defense zone left unbroken.

Drainage must be *dependent* as well as free. If it is not dependent it is not drainage at all, no matter how large an opening there is into the septic area. Serous membranes like the peritoneum can overcome suppuration although "drainage" may be in an upward direction. Other tissues have no such power. For instance a deep suppurating wound opening on to the front of the thigh must be drained, if the patient is on his back, through the healthy tissues of the posterior part of the thigh. An opening must be made right through, otherwise pus will pool in the wound and healing will not occur, the patient will become ill and the surgeon will regret his occupation. It is necessary to fail to provide dependent drainage only a few times to learn the profound and inescapable truth of this surgical principle.

Freedom of drainage is not so often hard to achieve. There are some instances, though, when considerable and irretrievable damage must be done. For example, in a septic wound involving the hip joint proper drainage can be achieved only by removing the head of the femur, and so losing the best chance of a firm ankylosis. The alternative is to run the risk of chronic suppuration which in the end is far worse than an unstable joint.

IMMOBILIZATION

Immobilization is concerned with the principle of *rest*. About general rest one might only say that, although it is difficult to estimate, there is some factor among all that goes to make up resistance which is conserved by rest of the whole body. Septic hands notoriously do poorly if left to walk about. Wounded animals have a highly developed instinct for rest which we often tend to vitiate by applying reason to the matter. There was once a fad for getting patients up 48 hours after appendectomy.

A discussion of local rest immediately throws open an inexhaustible field of theory and method. In fractures no one goes so far as to say that immobilization is unnecessary, but many surgeons are firmly of the opinion that

fractures "do better" if there is a little movement at the fracture ends to "stimulate healing". That is to say they advocate immobilization which is either not complete (and so not immobilization at all) or which is not prolonged until healing is complete. Mr. Watson-Jones utterly condemns this theory and goes so far as to say that non-union has only one cause where blood supply is ample—incomplete or insufficiently prolonged immobilization. Mr. F. Holdsworth, of Sheffield, has applied these principles to more than 20,000 fractures in a five-year period with only two cases of non-union—an ulna and a clavicle. Such results cannot be equalled by the application of any other theory.

It is just as advantageous to immobilize healing soft tissues as to immobilize healing bone. Every disturbance, even at long intervals, is a delay and a setback. The means of immobilization is too large a subject to outline here, but in fixing a septic wound, plaster of Paris stands alone. Nothing else is as good. Trueta thoroughly demonstrated this in his large and brilliant Spanish War series. But if drainage is not perfect before plaster is applied the results will be extremely unfortunate. At once, with drainage and immobilization, the patient has no more pain. Fever disappears, appetite returns, weight increases and haemoglobin percentage steadily improves. These are the signs to watch; never mind the smell. There are limits of course, but casts should be left on routinely for six weeks, and this is sometimes difficult only with the first cast. The earlier it is removed the more likely it is that fever and other signs of toxæmia will occur and the more will healing be retarded by the disturbance of changing plasters.

BLOOD SUPPLY

Problems of adequate blood supply nearly all refer to the limbs. The blood supply of the head and neck is so good that in these regions healing reaches its highest point and reconstructive surgery achieves its most brilliant successes. In modern traumatic surgery the only indication for immediate amputation is loss of blood supply. Unnecessary amputations of mangled extremities are now nearly eliminated. With an adequate blood supply the most remarkable healing can occur if infection is absent.

If a wounded limb enclosed in a plaster remains painful, with loss of sensation in the fingers or toes and perhaps even coldness and cyanosis in these members, attention should be directed, not towards the plaster, but towards the main arteries of the limb. For a long time plaster casts were blamed for the immediate circulatory deficiencies seen in injured limbs, and for the ischæmic contractures or actual gangrenes which sometimes followed. Of recent

years arterial spasm has been demonstrated as the frequent cause of many such calamities.

Before a plaster is ever applied to a wounded limb the quality of arterial pulsation at the wrist or ankle must be tested. It was failure to realize this which brought plaster casts into disrepute in some injuries—especially fractures around the elbow. If there is a normal pulse at the wrist or ankle a well applied cast will never cause circulatory obstruction but will improve blood supply by preventing oedema. If the pulse is absent in the wounded limb—even if the limb is warm and of good colour—a surgical emergency is present which must be attacked at once and may even require exposure and resection of the main arteries for its successful alleviation.

PRESSURE DRESSINGS

Pressure dressings have become an important factor in the management of wounds. The mechanical effect of pressure contributes a factor to more rapid healing which is not thoroughly understood although it is probably related to blood supply. It was earliest recognized in skin grafting where pressure is so important that grafting should not be undertaken unless pressure dressings can be provided. The results of burns treated with sulfathiazole emulsion are most satisfactory when pressure is applied. The best pressure dressing is a closely-fitting plaster, although this is often inconvenient or impossible. Other types need careful attention to see that they do not slacken.

Steady, firm pressure has several effects. In the early hours it prevents oozing of blood which would lead to haematoma formation and invite infection. It prevents oedema, which hampers efficient circulation. Oedematous tissue is notoriously slow to heal and liable to infection. The result obtained by pressure on an open wound is a smooth, thin healthy layer of granulation tissue in contrast to the thick, soggy, pus-laden surface of an improperly treated wound. Healing is more rapid and a thinner scar results.

ERRORS OF PRINCIPLE IN WOUND MANAGEMENT

A British surgeon recently wrote from the Tunisian front:

"Débridement.—All my Eye! Means excision of far too much. Skin edges rarely need excision. Dead tissue only is removed, and the wound, including deep fascia if necessary, opened up enough to allow adequate drainage and to relieve tension if present. We call this 'wound trimming'."

This surgeon is no doubt doing perfectly good work but he is not using his words with the same meaning as is given to them by traumatic surgeons. Although his idiom is picturesque, what he calls "wound trimming" he should call "débridement" and what he refers to as "débridement—all my eye!" is no doubt wound-excision. Put into proper terms his statement agrees with general opinion. It has become

axiomatic in this war as in the last that wounds of war should be left open, not sutured closed. Débridement is therefore the common procedure and wound excision with primary closure is uncommon. The reason for this is not obscure. At the line of battle it is impossible for medical organization to provide the fully equipped, bacteriologically adequate operating room that a hospital offers, and the wounded cannot often be brought to surgical treatment within a few minutes or even hours. The wounds dealt with are almost entirely to be classified as infected, according to the standards we have considered. Débridement and immobilization are therefore the indicated treatment. However, a bomb undoubtedly inflicts the same injuries when it falls on a battle field as when it explodes on a city street outside a British hospital, and in the latter case these injuries, because they were treated early in proper operating theatres, lent themselves to the procedure of wound excision, and this resulted in primary healing in numbers so large that the value of the treatment cannot be doubted. To get good results from excision and primary closure it is necessary to understand the limitations of the method.

Four hundred years ago Ambroise Paré treated wounds by pouring in boiling oil. This destroyed some of the bacterial contamination but it also devitalized a layer of tissue in the wound and so provided a medium for suppuration. To his eternal fame, Paré observed and recorded, having run out of oil, that wounds healed better when left untreated than when so cauterized. Today we smile at so crude a method, yet it has been our practice to pour into wounds any of a whole list of antiseptics each scientifically calibrated against carbolic acid to gauge its germicidal power. As of boiling oil it may be said of any known antiseptic that it destroys some of the bacterial contamination in the wound but also has the far outweighing ill effect of producing a layer of devitalized tissue which offers a medium for suppuration. It has become apparent that wounds heal better if care is taken to let no antiseptic enter them, and this safeguard is now standard surgical practice.

Ever since it has been known that suppuration is due to bacteria, and any pus whatever has ceased to be "laudable", great efforts in the treatment of wounds have been directed towards killing the bacteria. The natural powers of resistance of the tissues have been mainly neglected, and for a time it was forgotten that the *vis medicatrix Natura* still remains, as it has been through the ages, the bedrock and the salvation of medical practice. It is not possible for a moment to deny the importance of the discoveries and methods of Pasteur and Lister, but they gave the pendulum of surgery the impetus which swung it to the furthest extreme of applied bacteriology, and it is only now swinging back.

Germicidal methods reached their highest perfection, and achieved all they ever can do, during the last World War with the Carrel-Dakin method. Infection was often controlled and many lives were saved that might have been lost. No matter that for want of local rest the patient was continually toxic, that he suffered pain at every slightest movement, that he was feverish and lost weight and became anaemic. Winnett Orr started the pendulum swinging back with his application and popularization of the old surgical principle of local rest. After much re-education of the profession the management of wounds has been rescued from the bacteriological morass in which it was mired, and now it is accepted that control of infection is best achieved by the methods of wound excision and débridement, in which the natural healing power of the body is considered first and foremost as it must always be.

General and local rest being instituted, the wound surface itself should be left undisturbed. Routine change of dressings has been one of the plagues of surgery. Ordinarily, in surgical wounds or in wounds rendered surgically clean by excision, the only reason for removing the first dressing during the first ten post-operative days is to satisfy the curiosity of the surgeon. For no useful purpose this exposes the wound to infection and delays its healing by disturbing the incision line. Infected wounds present a greater problem because there is an instinctive temptation to inspect them frequently and to do daily dressings to keep them "clean". Such dressings become a horror to the patient. The daily ordeal wears down his spirit while constant toxæmia depletes his physical reserves. It is dramatically convincing to see such a regimen discontinued and the affected region immobilized in plaster. At once the whole picture changes (if drainage is efficient: this condition cannot be too often repeated). The patient at once becomes healthy, happy and hungry; safe inside his cast from the well meant administrations of his attendants.

Irrigations of different kinds have sometimes militated against control of infection. Flushing out a wound with some bland fluid such as saline or weak acriflavine is now being advised as a step in the process of wound excision. It is suggested as the final step before closing the skin, and its purpose is to wash out of the wound any bits of tissue or debris which have been overlooked and to sweep away any invisible contamination (germs) which still remain. Of course, irrigation can accomplish none of this. As much is washed further into the wound as is washed out, and the irrigation fluid itself, like every other object placed in a wound, is a possible source of infection. Irrigation of this kind is a ritual, and if it seldom does harm it likewise seldom does good and is quite unnecessary. Results are not one bit better for its use.

Daily irrigation of a septic wound with some form of germicide does positive harm. In lesions where adequate drainage does not exist and cannot be provided (*empyema thoracis*) such irrigations have been beneficial as the lesser of two evils, but in the management of the sort of wounds we are considering here they have no place, for we have seen that they sacrifice local rest and injure living tissue. Once efficient drainage is established the only justifiable indication for this type of irrigation ceases to exist.

With daily irrigations we encounter again the danger of re-infection which threatens when any frequently repeated local wound treatment is instituted. It has been established that a wound already septic can acquire added infection during irrigations or redressings. Sepsis is piled on sepsis. This is not an occasional misfortune but occurs very commonly in hospital wards even when the most elaborate precautions are taken. The sure preventive is to eliminate to the greatest possible extent all forms of treatment which demand daily exposure of a wound.

SULFONAMIDES

Consideration of these drugs has been left to the end intentionally—to be an adjunct to the discussion, as the drugs themselves must be an adjunct to, not the basis of, wound treatment.

Sulfonamides have been of great value in treating the wounds of this war, but they must never be allowed to become a substitute for thoroughness in wound excision or adequacy in débridement. If excision is not complete, or if drainage is not free and dependent, then the results will be worse whether sulfonamides are used or not.

In early treatment by excision and primary closure the use of sulfonamides *in the wound* is not greatly indicated. This is a matter very much under discussion. Some like to fill the wound with 10 to 20 grams of crystals, while others ease their conscience with a light sprinkling over. Some surgeons who have had the opportunity to treat a large number of early wounds have discontinued the routine local use of the drugs after thorough trial. Statistical studies will eventually show which method is best. However, the results of early wound excision are so nearly perfect already that there is scarcely any margin for improvement.

If sulfonamides are used in wounds treated early the most soluble should be employed. The undissolved powder is a foreign body. Sulfapyridine used in a series of 300 compound fractures observed by the writer resulted in significantly more postoperative fevers, more delayed unions and wider scar formation. As a result its use was considered to be contraindicated by the orthopaedic service concerned.

In soft tissue wounds the amount of oozing of lymph and the amount of fibrous tissue formation have both been noticeably increased by the local use of sulfapyridine. The more soluble crystals may not produce these untoward effects.

The sulfonamides do have an important place in the early treatment of wounds when administered *orally or parenterally*. The maximum effect should be obtained at once, because, whether or not there is to be infection is an issue decided within the first few hours, and if the drugs are to play any part in the decision they must be effective early. Maximum doses should be given intramuscularly while the patient is anaesthetized, and the blood level kept high for another 24 to 48 hours. Then the drug should be stopped. It has done its work by this time, or failed to do it. Most toxic damage caused by sulfonamides occurs with the long courses and there is no indication whatever for a long course of chemotherapy to accompany the early excision of wounds.

In cases of infected wounds the rôle of the sulfonamides is reversed. If infection is localized there is no indication for oral administration, but the crystals are often very usefully employed in the wounds. Almost all septic surfaces heal faster and stay cleaner when a sulfonamide, usually sulfathiazole, is applied to them. The more soluble the crystals, the harder it is to use them effectively under plasters and other dressings which are seldom changed. Large amounts can be incorporated into the dressings where they form a gradually dissolving reserve.

The sulfonamides are undoubtedly a boon to the practice of medicine, but we have learned too that mild toxic effects are common and serious and even fatal effects are not rare. Such drugs should not be used routinely but only with specific indication. No one should allow himself to be forced by the pressure of current enthusiasm into pouring them indiscriminately into every wound he is called upon to treat. It is salutary to recall again that boiling oil was once considered an indispensable application, and we ourselves have not been above filling wounds with necrotizing antisepsics.

Royal Edward Institute.

Salt is one of the five most important raw materials in the world, ranking with coal, limestone, petroleum, and sulphur. The United States leads all countries by producing 28% of the world's total.—*The Diplomat*, 1943, 15: 267.



Men and Books

CATECHISM IN MEDICAL HISTORY

By Heber C. Jamieson, M.B., F.R.C.P.(C)

Edmonton

QUESTIONS

- What preparations were necessary for the operation of phlebotomy two centuries ago?
- What city in India gave its name to and was the source of supply of a powder used in the sixteenth century and today?
- What control had the Church over the practice of Medicine in London in the sixteenth century?
- What poem on Medicine was written at the request of an English king?
- Bleeding from what small vein was supposed to be particularly valuable?

ANSWERS

- The "General System of Surgery", published in 1757, enumerates the following:
 - A linen fillet, about a Paris ell in length, and two fingers in breadth, with or without small strings fastened at each end of it.
 - Two small square bolsters.
 - Porringers or vessels to receive the blood.
 - A sponge with warm water.
 - Some vinegar, wine, or Hungary water, to raise the patient's spirits if he should be inclined to faint.
 - Two assistants, who must be void of fear, one to hold the porringer, the other to reach you anything that you shall want.
 - A small wax candle, when the patient is to be bled at night, or in a dark place.
- Goa. It was the principal Indian port of call for the English voyagers in the sixteenth century. Goa powder is used in the treatment of psoriasis.
- About 1518 an act was passed by which no person in London or within a distance of seven miles was authorized to practice without being examined and approved by the Bishop of London or of St. Paul's. This is believed to be the earliest statute in England governing the practice of Medicine.
- The School of Salernum (1200). This poem was said to have been written for the benefit of Robert, son of William the Conqueror, but some doubt this. The first book on domestic Medicine in poetry, it was probably based on a prose hygienic epistle written by Aristotle for his pupil, Alexander the Great. It gives directions for dieting and bleeding. A well known aphorism comes from it:

"Use three Physicians still; first Doctor
Quiet,
Next Doctor Merry-man, and Doctor
Dyet."

- A small vein, on the back of the hand, between the ring and little finger was known as the salvatella vein. In the days of chiro-mancy it was believed to have an intimate relation on the right side with the liver, the right kidney and the right lung; on the left side with the spleen, the left kidney, and the left lung.

Association Notes

THE WORK OF THE COMMITTEE ON EPIDEMICS

The two-day conference on epidemics held in Ottawa on December 3-4, 1943, was probably unique in the history of preventive medicine in Canada. The Committee on Epidemics was organized by our Association with the co-operation of the Department of Pensions and National Health, and the chairman, Dr. T. E. Leggett, pointed out that it was the breadth of its responsibilities that called for such a large group as assembled for the occasion. Representatives were present from public health departments, the medical profession, nurses, hospitals, volunteer workers, national women's organizations, labour, the Red Cross, the St. John Ambulance Association, the Armed Forces and other organizations.

The preliminary discussion and papers gave the necessary background of conditions with regard to epidemics both in the past and now. At the moment the form of influenza which was occurring in the country was considered to be of a mild form. The situation with regard to hospital accommodation was shown by Dr. H. A. Agnew to be acute. In industrial areas there were practically no hospital bed reserves at all, many hospitals averaging 90% occupancy, while in rural areas the position was better. In case of emergency such measures would have to be considered as evacuation of all patients who could leave hospital and the cessation of all non-urgent surgery. Isolation he agreed was valuable, but under pressure might not be practicable. As regards using such buildings as schools for overflow of patients, certain schools had been ear-marked for such a purpose, but the difficulty presented by scarcity of plumbing and the arrangements for food and hot water supplies would be very great.

The shortage of nurses even now it was pointed out, emphasizes the need for local organization and the preparation of auxiliary workers.

To the remark that there was a possibility of hospital staffs striking, the statement was made that the Trade and Labour Congress did not permit of such strikes.

The deliberations of the conference were finally expressed in a series of resolutions, beginning with one in which realization of the

gravity of the circumstances regarding the possibility of epidemics was stated, and urging that there be immediate organization of personnel and resources to assist the health authorities in coping with any such emergency that might arise. Such organization should be Provincial, with a National Committee to co-ordinate and encourage the work with interchange of ideas and information and should also be as wide in its scope as possible.

The suggestions for Provincial organizations were as follows:

1. Each urban or rural area throughout the Province should be a unit of organization.
2. List all doctors and nurses available.
3. The Victorian Order of Nurses and other similar nursing organizations will be invaluable in many localities as centres for organization of the Nursing Services.
4. List all trained nurses outside of active nurses, (retired, married, etc.), all so-called practical nurses, and others willing to take duty, whole or part-time, in case of emergency.
5. List all trained help such as St. John Ambulance Home Nursing Divisions, V.A.D.'s, Voluntary Nursing Aides, Stretcher Bearers and Red Cross workers available.
6. List all other essential helpers available and study the amount of additional training that could be given them.
7. List all automobiles, drivers and helpers available for transportation of supplies, fuel, food and medicines, patients to hospital, nurses to points of duty, etc.
8. Make survey of buildings that could be used for emergency hospitals: of beds, cots, bedding, cooking equipment, etc., that might be made available.
9. Organize patrols to visit every home to search out those where all are sick and unable to secure help.
10. Retain personnel and organization of Civil Defence.
11. Make study of what the Service Clubs and other lay agencies are able and willing to do; how the Navy, Army and Air Force personnel, both professional and lay, could be used; how the Police and Fire Department personnel could be used.
12. Make a study of how radio can be used to best advantage.
13. Newspapers and pamphlets are perhaps the most effective means of distributing information to the public.
14. As epidemics spread along the lines of travel, a study should be instituted and all plans laid for curtailing travel to the absolute minimum at the earliest threat of epidemic disease.
15. The conditions of sections of the Indian population, such as malnutrition, overcrowding and exposure, renders them particularly vulnerable to epidemics with attendant abnormally high death rates. Therefore we recommend that the needs of Indian communities in the face of an epidemic be kept in mind by the Provincial Committees.
16. Committees formed to carry out all the above surveys and studies should work in close co-operation and with complete understanding of each other's duties.
17. All efforts should be conducted with the full knowledge of, and in complete harmony with, the various departments of health.
18. Frame the results of all surveys and studies into one whole co-ordinated plan of action.

Further resolutions embodied recommendations to the Departments of Defence, Navy, Army and Air Force, that their medical personnel be made available for civilian needs in the event of serious and widespread epidemic disease, with a request to Provincial Medical Licensing Boards to grant provisional registration to medical officers where necessary: that wider use of immunization methods be made: that attention be drawn generally to the possible entry of those who might have unfamiliar diseases: and that provision be made in the Laboratories of the Department of Pensions and National Health for virus research generally.

THE ANNUAL MEETING

As previously announced the Seventy-fifth Annual Meeting will be held in Toronto during the week of May 22, 1944. General Council will meet on Monday and Tuesday, May 22 and 23. The scientific program being arranged for the succeeding three days provides for round table conferences, general sessions and sectional meetings, with considerable emphasis being placed on war medicine.

The weather in Toronto during the third week of May is usually delightful,—a nice time for a Spring breakaway after the strenuous winter months, now more strenuous than ever, for those who have been obliged to take on extra work.

Reservations may now be made at the Royal York Hotel where all sessions will be held, and it is not too soon to send in your application.

Realizing that we are meeting in war time, it has not been thought wise or proper to arrange for special entertainment, but members may be assured that a cordial welcome awaits them at the hands of their Toronto hosts.

Remember the dates,—May 22, 23, 24, 25, 26, and plan to attend.

In the next issue of the *Journal* we hope to publish the preliminary program.

Membership

The year 1943 saw the Association with the largest membership in its history, with a total of 7,578, including 2,472 in Military Service. This is a gain of 608 over the year 1942, and a gain of 3,577 since the beginning of the war.

It was believed by some that another world war might gravely affect our membership as did world war number one. Older members will recall that, at the conclusion of the last war, the Association, in membership and funds, was at a very low ebb. Indeed, as late as 1921, Council was faced with a resolution suggesting that the Association disband because of its precarious financial position. That storm was weathered by an aroused profession which agreed to double the membership fee from \$5.00 to \$10.00 and issue ten-year bonds in the amount of \$20,000, which, by the way, were entirely redeemed in less than five years.

Lest we should appear to boast, we hasten to add that our membership is far from what it should be. Many hundreds of Canadian Doctors still remain outside the Association. It is because of them that our critics can say, "The Canadian Medical Association does not represent all the Doctors of Canada". It is earnestly hoped that the nine Divisions will this year be successful in carrying the membership nearer to the goal which we ultimately hope to reach.

Military Membership

To all Canadian Doctors enlisted in His Majesty's Service, free membership for the year 1944 has been granted. Membership cards are being printed and will be forwarded to each one. This free membership does not include the *Journal* which may be secured, if desired, at a cost of \$4.00 per year.

Health Insurance

A special meeting of the Executive Committee was held in Ottawa on December 14th to receive Lt.-Colonel E. H. Botterell who was present as the official representative of the Canadian Medical Officers overseas, having been appointed by them to confer with the Executive Committee on the subject of Health Insurance. Colonel Botterell brought with him a memorandum which had been prepared by a committee representing the overseas Doctors, outlining the position which they took with respect to the proposed health insurance legislation in Canada. After dealing with the organization and composition of the Overseas Health Insurance Planning Committee, the memorandum went on to say, (and here we quote) :—

"Confidence in the C.M.A.—"

The Medical Officers of the R.C.A.M.C. (Overseas) express confidence in the Canadian Medical Association as their representative in all matters pertaining to Health Insurance, Public Health, the prevention and treatment of disease, research and other matters related thereto. They view the problems of Health Insurance in the broadest perspective and are concerned primarily with the maintenance and improvement of the health of the people of Canada.

Principles—

The 'twenty principles' adopted by the Canadian Medical Association and as published in the 'Overseas Bulletin' No. 1, December, 1942, are agreed to except where modified by the following:

- (1) That there should be a comprehensive health insurance program, national in scope and compulsory for the entire population.

The principle of having the scheme on a Dominion basis with active and positive central control, rather than on a provincial basis with Federal supervision, is most strong-

ly supported by the Medical Officers of the R.C.A.M.C. (Overseas). Such a plan would ensure uniformity throughout Canada and the maximum benefits of National Health Insurance would be equally available to all Canadians. It is suggested that this desirable result could be achieved by applying a procedure similar to that which enabled the implementation of the Unemployment Insurance Scheme on a Dominion-wide basis.

- (2) The provision of medical and surgical care of all conditions including those of industrial injuries and illnesses, tuberculosis, venereal disease, mental disease, cancer, etc., should be the responsibility of National Health Insurance.
- (3) Hospitals are an essential part of any comprehensive Health Service. Care must be taken to ensure that small hospitals as well as larger hospitals and University Centres are supported financially. This financial support is imperative so that the general level of medical practice may be improved and the hospital remain the centre of medical activities. The active control governing the building or extending of hospitals as well as the standards obtaining in such hospitals should be vested in the central body of the area with a view to maintaining a generally high standard of hospital service. A co-ordinated scheme of liaison between small hospitals and larger hospitals and teaching centres is necessary to provide the best possible service to patients throughout the country. The principle of Parallelism in relation to the responsibility and advancement of the clinical and administrative staff of hospitals is strongly endorsed.
- (4) Where circumstances indicate, Health Centres should be provided to form an important link in the chain of medical practice.
- (5) A therapeutic rehabilitation service for patients should be established as an essential part of a comprehensive health service.
- (6) Every possible effort should be made to co-ordinate more closely preventive and therapeutic medicine.
- (7) Special emphasis must be placed on the necessity of providing adequate financial support for research not only in the field of public health and preventive medicine, but in all branches of medical science.
- (8) The provision of an efficient comprehensive health service in future years depends upon maintaining and improving the standards of medical education. In order to achieve this desirable result, every effort should be made—

- (a) To attract the best of our youth into the study of medicine.
 - (b) To ensure that outstanding members of the medical profession will be enabled to teach, carry on research and direct medical education.
 - (c) To provide adequate physical equipment and to ensure the availability of clinical material.
 - (d) To make possible postgraduate training in special and general fields.
- (9) Any suggestion of inclusion of chiropractors, osteopaths or other irregular practitioners in the scheme would be very unfavourably received by the Officers of the R.C.A.M.C. (Overseas).
- (10) The health of the nation is of such prime importance, and the problems are of such magnitude, that the creation of a separate Ministry of Health under a Minister of Cabinet rank is strongly advocated.
- (11) The Medical Officers of the R.C.A.M.C. (Overseas) consider that the Canadian Medical Association should make a public statement outlining what, in its opinion, would be the most desirable form of comprehensive Health Service for the people of Canada. This statement would stand as the considered proposals of the medical profession of Canada."

* * *

It will be seen that the recommendations are almost completely in line with the thinking which has been going on here in Canada. The Executive Committee pointed out to Lt.-Colonel Botterell that we had not urged the inclusion of Workmen's Compensation in Health Insurance as cash benefits are indissolubly linked up with compensation and we would not desire to see cash benefits become a part of health insurance.

With respect to the last recommendation that the Canadian Medical Association take the initiative in outlining a comprehensive health insurance scheme, the Executive Committee took the view that it has as yet no mandate from the Association to take such action; and, furthermore, it is open to question whether we are not in a stronger position in co-operating with the Government as we have done, reserving to ourselves the right to accept or reject the legislation as it develops.

The Executive Committee expressed its gratitude to their overseas brethren for their magnificent co-operation in dealing with this important problem, and requested Lt.-Colonel Botterell, upon his return to the British Isles to assure his colleagues that every effort is being made and will be made to protect their interests.

Medical Societies

Montreal Medico-Chirurgical Society

Three years ago or even less it would have been a bold program chairman who would have devoted a whole society meeting to the subject of health insurance. Now it would be a very undiscerning chairman who would fail to devote at least one evening of his season to its discussion.

One could hardly help these reflections at this most successful first January meeting of the Montreal Medico-Chirurgical Society. There was a very sensible division of labour amongst the speakers. Seldom is it wise to let any one man carry the whole load of a subject at a meeting, especially when there are so many aspects to it as there are in the case of health insurance. On this occasion the meeting began with some general remarks by Dr. D. S. Lewis, President of the Association, in which he spoke of the developments leading up to the Association's unanimous decision to endorse the principle of health insurance. It was obvious that methods of medical practice were due to undergo some change. There was extremely heavy pressure in this direction from various groups. On the other hand it should be pointed out that Canada had a very high standard of medical services and medical education. These things should not be changed just for the sake of alteration alone. We, the profession, wanted progress, and this should be along the lines of giving better service to the public. Most medical men would agree that there was room for improvement in some respects. Particularly was this so in the case of the distribution of doctors throughout the country as a whole. There was a serious shortage of men in certain sparsely populated areas. Two things in the main should be taken account of: (1) More widespread provision of adequate curative medicine; (2) A provision of funds for considerable extension of preventive medicine.

The second speaker was Dr. Vance Ward, Chairman of the Committee on Economics of the Quebec Division. Dr. Ward dealt with the economics of health insurance so far as they were involved in the proposed legislation. The Heagerty Committee had based its drafted bill on certain estimates of the costs of medical care which were open to question. These estimates took no account of the possibility that under health insurance there might well be a rise in the amount of medical attention demanded by the public. It was true that if the total amount of money which was estimated as being available under an insurance plan, were divided by the number of doctors in the country a very reasonable lump sum would result for each medical man. But of course this could not be expected to come about. The costs of administration alone would have to be taken into account, to say nothing of hospitals, nurses and dentists. Nothing was said, too, about the

amount of free medical care now being given, which would have to be made up under the insurance plan.

The speaker of the evening was Dr. Harris McPhedran, President-Elect of the Association. Dr. McPhedran sketched the form of the legislation which it was expected would be brought before Parliament at its next session. This consisted of two parts. The first was a short enabling Bill in which were set forth certain general requirements to be fulfilled by each Province in return for Federal aid in carrying out health insurance measures in the Provinces. This aid would take the form largely of grants toward the cost of tuberculosis, mental disease, cancer and venereal disease and certain public health activities. No Province could receive such Federal aid unless its health insurance measure met the requirements laid down in the Enabling Bill.

But, of course, there was nothing to prevent a Province embarking on its own scheme independently and comment was made on the fact that the Minister of Health for Ontario, Dr. Vivian, was laying down certain plans along health insurance lines which were not yet definite, but which indicated that Ontario might easily work out its own methods independently.

The second part was a model Provincial Bill, which might or might not be followed by the Province. It was understood that each Province would work out its own methods.

Nothing definite could be said as to when the legislation would be brought forward. Still less could any forecast be made as to what form it would finally take. At the same time it was our duty to study the matter very closely.

Dr. McPhedran chose two problems which he considered of primary importance to the profession:

1. Co-ordination of all the sciences in the education of students and practitioners of medicine.
2. The application of knowledge so obtained for the prevention and cure of disease among the people.

These problems were most intimately bound up with health insurance plans. Were they going to be solved by these plans? The answer to that could not be given yet. As regards teaching however, it did seem as if there was a danger that teaching material might be interfered with, unless more definite provision was made to ensure the supply than existed in the present draft of the Bill. Representations through our Association on this point had been effective in producing some modifications of the original wording of the Bill which were more reassuring but still not convincing.

On the point of administration Dr. McPhedran discussed the various proposals, emphasizing the view of the Association that the administration should be through a non-political body, not public health departments.

As to methods of payment, there was abundant room for discussion, as well as for variation. We did not favour the salary method, but under certain circumstances and in certain special areas this might be the only solution to the question.

If the net result of the meeting could be summed up it might be in saying that the problems connected with health insurance legislation were defined, but at the present stage no clear answers to them could be given.

That we would have to face changes is fairly certain. That we should prepare ourselves both to meet them and as far as possible to guide them by properly informing ourselves, would seem to be the part of wisdom.

Correspondence

Dr. Heagerty Corrects Us

To the Editor:

On page 72 of your issue of January, 1944, I find the following statement referring to evidence given by me regarding Health Insurance before the Special Committee on Social Security: "His answers were not always consistent".

You attribute to me the following reply in answer to a question: "Broadly speaking, there is perhaps nearly enough money being spent by rich and poor to provide fairly satisfactory service for all"—Volume 3, page 101. This statement was made by another witness and not by me. This erroneous statement originated with the Committee on Economics, British Columbia Medical Association. I took objection to it and suggested that a correction be made. This was not done. The following statement is also contained in the same paragraph: "In a general way the figure was calculated by estimating the total cost of medical care in Canada in 1935, adjusting this figure to the increased population of 1938 and dividing the total into the population over the age of 16." This statement was not made by the Committee on Finance. Such a loose method of calculation was not adopted by the Committee.

In view of the above erroneous statements, the note on page 73 of your issue of January, 1944, is not well taken. It is difficult to overtake an erroneous statement and I assume, therefore, that the publication of this letter will make little difference to the Committee on Economics, British Columbia Medical Association, or to the groups who have been misled. Do you not think it would be advisable for the Canadian Medical Association, when dealing with a subject as important as Health Insurance,

to make certain that erroneous statements such as those mentioned above are not published under the auspices of the Association? I would suggest that all statements relating to Health Insurance that require publication be issued under the name of the Health Insurance Committee of the Association. In such a manner erroneous statements and unjust criticisms may be avoided.

J. J. HEAGERTY, M.D.,
Director, Public Health Service.

Supplies of Evaporated Milk

[The following letter has been received by the General Secretary from the Wartime Prices and Trade Board.—EDITOR.]

"The Management Services Division has brought to the attention of our Board a number of comments from retail grocers to the effect that due to short supply, retailers are often unable to supply specific brands of evaporated milk as may be requested by consumers upon recommendation of individual doctors.

"In this connection, we wish to inform your Association that it is quite possible that certain brands of evaporated milk may not be available on particular markets from time to time and it would be appreciated if your members were to bear this in mind when prescribing evaporated milk for patients.

"Our Board, in endeavouring to assure adequate supplies of evaporated milk to essential users, does not make any distinction between brands, and for this reason it may not always be possible to supply the brand name which is prescribed or requested.

"We would greatly appreciate your bringing this fact to the attention of the members of your Association.

R. M. FOWLER, *Secretary.*"

Ottawa,
December 28, 1943.

Medical Economics

To the Editor:

Comparison is made in the January number of the *Journal* of methods of remuneration for doctors' services under Health Insurance. Advantages and disadvantages are listed under, (1) fee for service; (2) capitation. These comparisons are not made under salary, presumably because it is unthinkable that we should adopt such a method.

I am not aware that the profession has gone on record as being opposed to nationalized medicine. I understood that they said that they favoured the per capita method where possible and the fee for service for specialists. That is as the draft act stood.

You raise several points, which we are asked to keep in mind; but, as I see it, nationalized

(state) medicine is the only method by which all the points raised can be met.

I have been engaged in general practice for over thirty years; I am very far from being a socialist but I can tell you straight that if the Canadian people are not prepared to nationalize the WHOLE medical profession, and to take over all the hospitalization, and the medical colleges then they had better forget all about Health Insurance until they can afford to do so.

I am for going all the way or nothing.

92 Lonsdale Ave.,
North Vancouver, B.C.,
January 13, 1944.

D. J. MILLAR.

Methods of Payment Under Health Insurance

To the Editor:

There is no doubt in my mind that the fee for service method is the only acceptable one, considering both the interest of the patients and the profession.

I think that only very few confrères will consider favourably the salary method; as you say yourself it might be necessary in some sparsely populated districts, but it is only to be considered as a compromise, and should even under such circumstances be combined with some kind of fee for service system. With a salary system, pensions, seniority we will find bureaucratization of the profession at a rapid progress, and the whole system will be ready for state medicine in a short time. One of the most objectionable traits of the salary system is payment for experience or seniority; it means mainly not payment for actual knowledge but for calcareous deposits in the cerebral vascular system.

Under the fee for service system the doctor-patient relationship will be the least disturbed. It will be easier for the patient to retain free choice of his physician, whereas under the panel system changing of physicians will be connected with a certain amount of formalities; certainly, a frequent change of physicians is neither desirable, nor necessary, but any compulsory linking of the patient to the doctor is absolutely to be deprecated.

As to the disadvantages of the F.F.S. system: the main objection seems to be the excessive amount of bookkeeping; I admit that it will be bothersome, but an abundance of red tape will be necessarily linked with Health Insurance anyway; I think it is very well worth while to pay for retention of the F.F.S. system with some extra bookkeeping. After all we have to do just about the same amount of bookkeeping now, and at least we should be saved under the Health Insurance scheme to have to send out our accounts repeatedly. I do not think that records of disease would suffer on account of the bookkeeping, I am moreover of the opinion that most of our confrères will rather keep

accurate records and progress notes under the F.F.S. system than under the capitation system where payment will be made regardless of record or no record.

As to the tendency of not referring the patients: we will find this tendency among some men, even if we would adopt the capitation system. I myself can recall cases in which the attending physician was "hanging on" for dear life, and without any monetary consideration, as he knew that no payment would be forthcoming anyway. Some confrères think very seldom of consultations and try to handle any and every case. This false pride will certainly not be overcome by the capitation system, although it might receive an extra stimulus from the F.F.S. system.

As to unnecessary operations and procedures: unfortunately we always will have to count with the irresponsible amongst us, and every scheme is open to abuse. But speaking of "lesser sins"—I am sure that the tendency to "bottle-doctoring" and neglect of nightcalls under the capitation system will be much greater than the tendency of unnecessary calls and unnecessary operations under the F.F.S. system, if we take the profession as a whole, discounting outspoken crooks and highest-principled idealists. Taking these traits into consideration I am sure that the public will be much better served under the F.F.S. than under the capitation system. As to the advantages of the capitation system: I cannot very well understand the logic of the statement that "it should tend toward placing more emphasis on the prevention of disease. . . ." Apparently it is to mean that with inoculations and periodic examinations the incidence of certain diseases can be lowered, resulting in less calls and consultations. So far so good; however, the incentive for preventive medicine will be still greater if the respective work will be paid fee for service. Actually this point speaks in favour of the F.F.S. system, and not for the capitation system.

That it "has survived criticism" is certainly not an advantage. We certainly do not want anything which has "survived" in another country, but we want the best possible and attainable.

The remark as to "economic stress" will certainly appeal to the few fixed-salary-minded amongst us, but I am sure the overwhelming majority prefer to be paid for the work actually done, and not for names on a panel.

Of the disadvantages one factor has not been mentioned: the danger of some less responsible confrères canvassing the country for the panel, either directly or by some go-betweens. This is a factor which ought by no means to be neglected. It will be much easier to bring pressure to bear on patients along this line under the capitation system than under the F.F.S. system. Also one should not overlook the following fact: under the F.F.S. system the practitioner is per-

factly free to refuse a nuisance call to some known neurotic, under the capitation system he is sold to the public body and soul. He will have to attend minimum and imaginary ailments preferably in the patient's home at any time and in any weather, and will meet the severest criticism if he will not follow every call.

To sum up, and to answer the five questions put at the end of the article in the January issue:

1. F.F.S. will definitely help to produce the best medical service for the people.

2. Its administration probably will be more expensive than other schemes, but this disadvantage will be by far balanced by the better service under the F.F.S. scheme.

3. There should not be a great difference in the number of patients referred to teaching institutions. Conscientious physicians will refer their patients under the F.F.S. system just the same, and there will be always public opinion asking for consultation of specialists and investigation of seemingly complicated conditions in well staffed teaching hospitals. On the other hand, with the unscrupulous practitioner the capitation system will certainly not *per se* guarantee a free flow of suitable cases for teaching purposes, as pointed out above.

4. There is no safeguard against crooks in any profession or occupation. The capitation system may be a better safeguard against financial exploitation of public funds, it will *not* be safeguard against neglect of the patients, and will not safeguard against exploitation of the honest members of our profession by canvassing the country for patients. The profession as a whole should not be punished by a decidedly less desirable system, just to eliminate the possible financial malpractice of some unethical members.

5. On a free continent, where free enterprise is one of the mainstays of our social and economical system undoubtedly the F.F.S. system will attract the best type of young men and women to our profession. We do not want uniform masses without stimulus, put into a bureaucratic scheme. With the adoption of the principles of Health Insurance by our profession we have made the first step toward the ant-state, anyway, it was a step towards the paternalistic state with security for all and for everything. This security can only be bought by surrender of freedom and by lowering of the standard of living. It would be very easy to obtain absolute "security" for everybody by opening government-controlled feeding centres and dormitories, issue regulation cover-alls, and create a system of state medicine, with complete coverage, and possibly elimination of the incurable ones for the sake of efficiency. I think a similar pattern has been developed somewhere else, and we are supposed to fight this war against such patterns. Only by retaining the fee for service system will we be able to have a workable system. All

other systems will be of less service to the public, and will enslave the profession inevitably into red-tape, bureaucracy and abject dependency on everybody.

Provost, Alta.,
January 14, 1944.

A. F. PERL.

Special Correspondence

The London Letter

(From our own correspondent)

SCHOOL MEDICINE

The new Minister of Health has called this a White Paper Christmas and although we are still waiting for his contribution to the flood of official publications we have had an interesting instalment in the shape of the new Education Bill. This will necessitate great extensions and improvements of the School Medical Service, for it lays down that education authorities now have the duty of providing not only for the medical inspection but for the treatment, other than domiciliary treatment, of all children and young persons attending maintained schools, and what are to be called young people's colleges, free of cost. Moreover, the benefit of the school medical service is to be extended to pupils of schools receiving grants and also to the independent schools.

The age for attendance at schools for the handicapped, is lowered from seven to five years and parents of any child over the age of two who is suspected of being handicapped, can call for a special examination. More trained medical and nursing personnel will be required. At present there is no statutory qualification for a school nurse and as regards schools doctors there is no special training. It is clear that plans must be made at once and it is hoped that those physicians who have devoted their whole lives to the care of children will be freely consulted.

NURSES' PAY

The special committee under Lord Rushcliffe continues its work on the pay and conditions of services for nurses. A recent report dealt with non-hospital nurses, particularly with the district nurses, the health visitor, and nurses working in nurseries. There have been certain criticisms of the scales proposed, particularly as regards the differences between the health visitor and the district nurse, but the subject is complicated by the differences in training required, and it is likely that some drastic re-organizations of the whole of public health and domiciliary nursing will be arranged in the future. At any rate it is safe to say that the nursing profession is, at long last, getting the recogni-

tion as a national service which it so rightly deserves.

DETENTION BARRACKS

Earlier this year there was a great stir when an army prisoner died and two warrant officers were tried for manslaughter. A special inquiry was set up and in the report issued last month, it was clearly brought out that the medical arrangements were much more favourable than had been thought. Clearly, the work of a whole-time medical officer in a detention barracks is not suitable for every doctor and with a shortage of medical man-power it is not easy to secure just the right type of person. The strongest criticisms were made of the sanitary arrangements and of the conditions of life in the naval detention quarters. The committee wisely commented on the keeping of men out of detention, for in this, as in so many other matters, prevention is better than cure.

INFLUENZA

The authorities were rightly somewhat alarmed when an epidemic of influenza began to show itself in November. The weekly returns of deaths from this malady began to rise sharply, but the last report shows a drop and it is hoped that this wave is over. The shortage of doctors led to serious overwork for the remaining practitioners and the Ministry of Health not only made arrangements for the temporary deferment of the call-up of doctors but also for serving medical officers to be available for both hospital and private practice in districts where county Medical Officers of Health considered this was necessary.

Shortage of domestic help also led to great trouble in the homes and arrangements were made for the supply of meals and for home helps to various existing societies. Boy scouts and other youth organizations were pressed into service to help with shopping and in fact everybody rallied round in a thoroughly satisfactory manner. Fortunately for most patients, the disease was short and did not require much treatment.

London,
January, 1944.

ALAN MONCRIEFF.

The usefulness and the importance of any profession in the social order rests upon the fidelity with which it holds fast to the sound and basic principles developed in the past and the vision with which it adapts those principles to the evolving challenges of the future.—C. A. Winslow, *The Evolving Pattern of Tomorrow's Health*, *Am. J. Pub. Health*, 1943, 33: 1408.

Canadian Medical War Services

MEDICAL OFFICERS APPOINTED TO THE R.C.A.M.C.—ACTIVE FORCE DECEMBER, 1943

(Previous sections appeared in the February, March, May, July, September, November and December 1943, and January 1944, issues)

SECTION XXI

Name	Address	Date of Appointment	Name	Address	Date of Appointment	Name	Address	Date of Appointment
Clark, G. A., London, Ont.		19-11-43	Gompf, J. E., Arthur, Ont.		17-11-43	Mailloux, G., Montreal		1-12-43
Corston, J. M., Canadian Army Overseas		25-9-43	Hoppins, A. W., Toronto		29-11-43	Martin, J., Lachine, Que.		25-11-43
Darke, T. V., Regina, Sask.		13-11-43	Langis, L. R., Sherbrooke, Que.		3-1-44	McLeod, A. M., Toronto		22-11-43
Duff, G. A., Pt. Arthur, Ont.		16-11-43	Levine, M., Windsor, Ont.		17-11-43	Radoux, V. H., Gravelbourg, Sask.		4-11-43
			Levitt, H., Toronto		17-12-43	Stebnicki, A. O., Winnipeg		4-11-43

MEDICAL OFFICERS STRUCK OFF STRENGTH OF THE R.C.A.M.C.—ACTIVE FORCE DECEMBER, 1943

Name	Address	Date struck off strength	Name	Address	Date struck off strength	Name	Address	Date struck off strength
Demers, L. P. E., Farnham, Que.		29-11-43	Long, G. S., Edmonton		25-11-43	Saxton, G. D., Ocean Falls, B.C.		30-11-43
Harris, R. I., Toronto		16-10-43	Morgan, G. S., Montreal		2-12-43	Stewart, D. W., Hamilton, Ont.		9-11-43
Riddell, L. H., Norwood, Man.		1-12-43						

Miscellany

PRIÈRE D'UN MÉDECIN DE L'ARMÉE

[We are glad to be able to reprint the following "Prière d'un médecin de l'armée" from "L'Action Médicale", December, 1943. It takes the form of a letter to the editor, and even though a little belated in season now, is still worthy of republication. We have attempted a very free translation; but those who know Quebec will quickly see that some of the phrases cannot be fully rendered.—EDITOR.]

L'Action Médicale,
Montréal, Canada.

Monsieur le rédacteur,

A l'occasion de Noël, l'un de vos anciens collaborateurs vient vous demander un petit coin dans la revue qu'il voudrait bien recevoir encore.

Au cours de mes randonnées militaires, j'ai eu l'occasion de faire à revers, la fuite en Egypte, c'est-à-dire que je me suis rendu de l'endroit où la Ste-Famille est supposée s'être arrêtée près du Caire jusqu'à Jérusalem et de là à Bethléem. Du Caire à Jérusalem il y a seize heures de train que je résumerai d'une façon un peu vulgaire mais bien connue: il fait chaud et ça peu, et on n'est pas trop "ben" surtout si le vent souffle du sable partout où l'on n'aime pas en recevoir.

De Jérusalem à Bethléem je fus plus chanceux et j'ai fait le trajet en automobile et j'ai même arrêté me saucer dans la mer Morte, en passant.

Pendant que la voiture dévalait les montagnes de la Judée le long de l'Hébron desséché, je me reportais trente ans en arrière, alors que je me pâmais devant les pages de cathéchisme en images, et je me demandais vraiment lequel avait imité l'autre, de l'artiste ou de la nature; ça ne me surprendrait pas d'avoir rencontré des gens qui ont connu la Sainte-Famille, car ils sont encore dans le même costume et demeurent dans les mêmes étables (en terre séchée au soleil et non en bois comme celles que l'on voit habituellement dans les crèches de nos églises), avec les mêmes grands bœufs gris et les mêmes petits ânes, que depuis ce jour je n'aime pas à comparer aux paresseux car ils travaillent très forts; je dis maintenant paresseux comme un ânier car lui vraiment prend la vie aisée.

Et c'est à Bethléem même que m'est venue l'idée de vous adresser pour votre numéro de décembre, ma plus récente "Prière de Noël".

Mon Jésus de la crèche je ne suis pas bien dévôt, et si je dois parfois me mettre à genoux, pour me couvrir, je dis plus de jurons que de prières (des fois c'est les mêmes mots) mais ce soir c'est ta fête et tu m'entendras. Ramène les "civilisés" d'aujourd'hui à la "barbarie" de ton temps et donne-leur la bonne volonté qui fait la paix.

Change Adolf, Benito et Hirohito en Rois Mages (puisque tu fais des miracles). Transforme ces avions en anges et change leurs vrombissements en cantiques. Métamorphose ces tanks et engins de guerre en moutons et

leurs équipages en bergeres. Change ces bran-
cards en traîneaux et l'ambulance en chapelle.

Fais de mon casque d'acier un bonnet de
fourrure et de cette pluie de balles une bordée
de neige. Ainsi-soit-il.

Bethléem, juin 1943. YVANO DUPUIS.

"At this Christmas season, one of your old
contributors would appreciate being allowed to
use a small corner in your pages to which he
turns with such pleasant memories.

"In the course of my military journeyings, I
have had occasion to carry out the Flight to
Egypt in reverse, that is, I have travelled from
near Cairo, where the Holy Family is supposed
to have stopped, to Jerusalem and thence to
Bethlehem. From Cairo to Jerusalem I had a
sixteen-hour train journey which, to put it
crudely, was hot and smelly. Along with it
all there was the continual blowing about of
sand, which penetrated uncomfortably to one's
inmost parts. From Jerusalem to Bethlehem I
was more fortunate, as I was given a lift in a
car, and I was even able to stop and 'dunk'
myself in the Dead Sea.

"As my car rolled through the mountains of
Judaea along the dried-up Hebron I carried my
mind back to the time thirty years ago when I
was poring over the pictures in my catechism,
and asked myself now whether it was art or
nature which was being imitated in these. It
would not have surprised me to have met some-
one who had known the Holy Family, for the
people still dress in the same way and live in
the same cattle sheds,—but these are of sun-
baked clay, not wood, as usually represented
in the cribs displayed in our churches. There
are the same big grey oxen and the same small
donkeys, which I will never again call lazy as
they work very hard. I would rather say 'lazy
as a donkey driver' for he indeed takes life
easily.

"It was at Bethlehem itself that I thought of
sending you for your Christmas number this
'Christmas Prayer' of mine.

"My little Lord Jesus, I am not very religious,
and if I sometimes fall on my knees it is to
protect myself, and I swear more than I pray
(sometimes in the same words). But tonight
is Thy festival and I can turn to Thee in prayer.
Recall the 'civilization' of today to the 'bar-
barism' of Thy time and grant us the good will
which gives peace.

"Change Adolf, Benito and Hirohito into the
Three Wise Men, (since all things are possible
with Thee). Transform these aeroplanes into
angels and turn their thundering into hymns.
Change these tanks and engines of war into
flocks of sheep, and their crews into shepherds.
Turn the stretchers into sleds and the ambu-
lances into a chapel.

"Make my steel helmet into a fur cap and
this rain of bullets into drifting snow. Amen."

YVANO DUPUIS."

WITH THE RED CROSS IN CHINA

[The following is the substance of a letter from Dr. Bob McClure of the Friends' Ambulance Corps in China. It was written from Kutsing, Yunnan, in May, 1943, to friends in Canada by whose kind permission it is reproduced. Dr. McClure will be remembered by his many friends, particularly in Toronto and Montreal. He has probably seen more of the fighting in China in the last eight years than any other Canadian.—EDITOR.]

I have now charge of the medical work in the
new program which is big enough for me and
which is more in my line. From now on I shall
be mostly in the field near the Burma front.
We have asked for six more doctors from
England and the United States and we hear that
in United States alone there are fifteen wanting
to come. These cannot get out here for some
months and "in the meantime" is our greatest
worry.

Our new system is that, instead of being a
foreign unit working where we feel the pressure
is greatest, from now on we come in under an
enlarged Chinese Red Cross scheme getting
ready to make a better job of the Burma cam-
paign than has yet been made of any campaign
in China. We in the F.A.U. are putting two
mobile surgical teams in the field and for a third
are borrowing the doctors and one nurse from
the British Red Cross, and all three teams will
be under my direct control. We shall be located
at the headquarters of each army with three
divisions in front of us to feed us with their
cases. At the back of us there is getting set
up an elaborate base hospital system better than
China has yet seen. China is throwing in all
her supplies that she has on hand and new
supplies will, when needed, be brought in from
India by air. Once in position, we have to get
the medical men in the divisions and battalions
into shape and train them to know what to send
back and what to keep. I am moving in with
our first team next week. All teams will be
west of Kunming but we cannot let it out where.
I shall move in with the second team three weeks
later and it has to go twelve days by pack mule
into the China-India border country about the
middle of the "hump" over which planes now
fly. The third team will be far west, but near
the motor road. The second team has the most
thrilling position if they will let us keep it. It
is surrounded on three sides by enemy forma-
tions and is in some of the highest mountain
country in the place. Mountains there are
18,000 feet and up and passes are 14,000. Units
on the ground are not issued with oxygen but
if you fly at this level you sit still and get it
fed to you by tube!

I got back one week ago from a most interest-
ing trip into Honan. I went to Chengchow, the
Southern Baptist Mission station just south of
the Yellow River and the nearest to our old
field of work. I saw the city walls of Wen
Hien quite clearly, for the Yellow River flows
towards the north there and is just outside the
south gate of the city. I went over on the sand

flats to within a mile or so of that city. That was sixteen miles from Hwaiking. What I would have given to go on over!

The purpose of my trip was twofold: (a) to see what could be done by our unit in relief work and (b) to get away from the Baptist Mission Hospital in Chengchow their big x-ray machine. I helped to put in that machine in 1937 before the war and now it appeared that I was the only one in China who could safely take it out. It was quite a job. The machine weighed a total of three tons and we had to take it pretty well to pieces, too, for it finally had to come to the railway 95 miles on rickshaws. I never knew before that you could take a machine down to such small bits.

The famine conditions are beyond description. It has worn down the missionaries terribly. It does wear you down too to see folk whose faces you recognize daily getting thinner and more anxious and then see their bodies dead on the roadway some morning. The Canadian Anglican mission in George Andrews, the Free Methodist Mission in Mr. Ashcroft and the Southern Baptist in Misses Murray and Stribling carry most of the weight in relief work. Miss Clark, of course, is doing fine work among the children. Young Bill Simpson of the C.A.M. is my new friend and is the hope of their mission. Bill is quick on the uptake. He is getting a bit hard-boiled, which is badly needed and, even though he is rather lonely in passing through these experiences, yet he is learning from them. There is a very vigorous and bright young Italian Catholic padre in charge of their side of the work. He is a friend of mine of five years' standing and he and Bill are the hope of Chengchow.

Famine relief, in order to be really efficient, has to be a little hard-boiled. They were too soft in Chengchow at the start and so started denominational soup kitchens though they did have a good committee to link up the work. The soup kitchen is rather antiquated, however, as a large-scale method of meeting a famine. It is not the fault of the people there, but they had no one who knew anything at all about rural credits, seed loans, well-digging loans and such things. Herbert Boyd could have saved the price of an aeroplane and its fuel to fly out if he had been on the spot. They are getting moving on that now. The people up here are all keenly aware that the soup kitchen is not the best method and they are keen to learn of another way to do it. Personally, I think that all the older members will be so run down after this show that they will all have to go home for a long furlough. Chengchow is the centre of the famine, Huschang is not quite as bad and from what we could find out things north of the river in occupied areas were distinctly worse than anything on the south. It was a pity that we did not have such a team as the Mitchell, Copland, Matheison, Roulston, Boyd group, to

put in there. In round numbers such a team would have actually been able to save several thousand lives I feel sure.

The x-ray was a better show. I got it to Loyang where we put up with our good friend Bishop Tom Megan formerly of Hwaiking and then of Sinsiang. He is now Bishop of Loyang and is putting American pep and fire into a sleepy Italian Catholic Mission. Megan is now the leading personality along the northern front. He has also taken over personally the business management of the Loyang Catholic Hospital and has turned it into one of the best run hospitals in free China with entirely Chinese staff. He fired all hired nurses and has his pupil nuns doing all the nursing with a devotion and enthusiasm that cannot be equalled in any hospital. No talk of hours, no talk of pay, no talk of strikes and holidays. He has over 200 girls on the waiting list trying to get into the order! They certainly have something there. In the rest of China the pampered position has passed from truck drivers to nurses who now ordinarily ask NC\$3,000 per month, and board and the right to make any money they can on the side! An x-ray plant I had obtained for their hospital in 1938 had been broken for two years. I got them a small one to take its place, salvaged from Chengchow and broken, but between the two we got one to work well. I also borrowed a microscope that was buried in the country outside Chengchow and there is now a Union Co-operative Laboratory in Chengchow for both Lutheran and Catholic Hospitals and for the private practitioners as well.

The main x-ray I got by train to the end of the railway at Paochi about 150 miles beyond Sian. Here we put it up in a thoroughly bomb-proof cave. We know it is bomb-proof because it has been hit three times. The x-ray had not been in use for three years since the city power plant was blown up, the last doctor to use it had left no notes as to whether it was working or not, so you can well imagine the thrill when we had it set up in the cave, checked it all over, then pressed the switch to find it was in perfect working order. It is doing good service. It is the largest x-ray machine in free China.

Just a word on the recent conference of the Chinese Medical Association near Chungking. I was able to take a small part in it and had two days at its meetings. The most striking thing is that these medical conferences now are no longer dominated by foreigners. In fact foreigners do not any longer play a very important part in them. They are up to the best standards at home in the papers delivered and in the quality of leadership that they command. A morning of military medicine was particularly well attended. The total attendance at the conference was a surprise. In war-time with transport at its most difficult stage they expected some 200 doctors. They had just under

400 registrations. Our U.C.C. people did take a prominent part, Stewart Allen, of Chungking, Wally Crawford, of Chengtu, and E. B. Struthers, of Cheeloo, are all leaders in their lines. Struthers has done marvelous work in reviving the English edition of the *China Medical Journal* in a war-time edition that is very timely. The material is not only local but is obtained also in the form of abstracts from micro films of medical journals from all over the world which are now coming in very limited numbers to China.

The particularly interesting thing was in the Council on Medical Missions. This up to a few years ago was run and dominated by the medical missionary from abroad. Today there is as much enthusiasm as ever in that Council but it is all from outstanding Christian Chinese doctors who are not only interested in Christian medicine, but who in many cases now hold the sole responsibility for some of the most go-ahead mission hospitals. This to me was extremely encouraging and is a sign of a marvellous harvest as the result of the century and more of foreign medical missions in China. One feels that this tree at least is sufficiently firmly planted now within the country that we need never be in doubt as to its viability in the future.

THE "S.S. FREDERICK BANTING"

By John R. Williams, M.D.

The launching of the *S.S. Frederick Banting* on December 20, 1943, at the Bethlehem-Fairfield Shipyard in Baltimore, Maryland, was a noteworthy success. The ship, a Liberty, is 500 feet long, 10,000 tons, and cost \$2,000,000. Among those attending the exercises from Toronto were President Cody of the University, Lady Banting, Drs. Charles H. Best and Ian Urquhart, Mr. and Mrs. Rogers, and a member of the student body. The Canadian government was represented by Ambassador Leighton McCarthy; the Sponsoring Committee by Colonel L. G. Rountree, Drs. Alfred Blalock and John R. Williams; Johns Hopkins by a delegation of six faculty members; the Maritime Commission by Mr. Julius Bouslog; and the Shipbuilding Company by several of its officials.

The ship was christened at the noon-hour in the traditional manner by Lady Banting breaking a bottle of champagne over the bow. As the ship slid down the ways, the band playing the national anthems, it presented a magnificent sight. After its plunge into the bay, it stood with its huge silver-grey bow proudly pointing toward the audience, as though it were acknowledging the high tribute that was being paid to a great man and his people. Mr. Willis, manager of the shipyard, presented to Lady Banting a beautiful gold brooch in leather case, suitably marked with a gold plate. The party then adjourned to Hotel Belvedere for luncheon and brief informal exercises. Mrs. Willis graciously

acted as hostess and at the conclusion of the luncheon proposed a toast to the King. A toast to the President was offered by Dr. Best, and one to the Sponsoring Committee by Ambassador McCarthy. Other toasts were in memory of Sir Frederick and the British seamen.

Dr. Williams presided at the informal exercises and extended the greetings and appreciation of American physicians. Ambassador McCarthy expressed the gratitude of the Canadian people for the high honour which had been bestowed on his country and its illustrious son. Dr. Cody, in eloquent voice, said that this act of the United States government was a most unusual honour and expression of friendship of one great nation for another and that the people of Canada, especially the members of his faculty, were sensible of it. Lady Banting proved to be a charming sponsor and won the hearts of all, both by her cordiality and her words of gratitude. She said that of all the honours that had been conferred upon her husband, she was sure this would touch him most. She presented a portrait of her husband to be placed in the cabin of the ship. Dr. Best spoke feelingly of his association with Dr. Banting. Dr. Urquhart, custodian of Banting memorabilia, read a script citing the notable facts in the life of Sir Frederick, to be engrossed and presented to the ship. Colonel Rountree paid high tribute to Banting as a scientist and inspirer of young men. "Canada has contributed two great men to medicine, Sir William Osler and Sir Frederick Banting", he concluded. Dr. Blalock voiced the greetings of Hopkins and emphasized the debt to Canada for the many able teachers who have contributed to its development and progress. Mr. Bouslog spoke enthusiastically of the impressiveness and significance of the launching and stated that in view of its broad implications of international good-will, the Maritime Commission had decided to present the *S.S. Frederick Banting* to the British government. Dr. Williams concluded the program by thanking the Maritime Commission for making the *S.S. Frederick Banting* possible and the officials of the Bethlehem-Fairfield Shipbuilding Company for their extremely generous hospitality.

STATE MEDICINE

[Writing on State Medicine as a possibility in Britain Dr. J. B. W. Hayward, M.B., Ch.B., says in part in the "British Medical Journal" of October 16, 1943.]

"It follows, that any reorganization of the medical profession and the health services will affect the great democratic public. Are they, the patients, aware of the sense of freedom they are going to lose? The possible penalties they may incur if they refuse treatment? The certain loss of a portion of their cherished right and privilege of professional secrecy, when the doctor has his 'quarterly returns' to fill in? The criminal view that must be taken by the State

of neglect and failure to carry out treatment calculated to restore the patient to health in the shortest possible time in order that he may return to work? And also the slightly lowered prestige of the family doctor if he becomes completely a servant of the State, thereby losing some of his independence, which has been treasured in the past as much by his patients as by the doctor himself?

"Let the legislators take care that they, and the vast number of individuals they represent, are aware of all the implications that the phrase 'comprehensive health service' means."

Abstracts from Current Literature

Medicine

The Incidence of Gallstones in the Higher Age Groups.

Dessau, F. I.: *New Eng. J. Med.*, 1943, 229: 464.

Post-mortem records of 3,242 autopsies at the Long Island Hospital, Boston, covering the period 1900 to 1942 inclusive, were studied with reference to the frequency of gallstones in relation to age, sex and lesions of the gall-bladder, and to the question as to whether there has been an increase of cholelithiasis in recent decades.

Of the total of 3,242 post-mortem records, 2,791 concerned patients over forty, and 451 patients under the age of forty. It was found that the incidence of gallstones increases directly with increase in age. Cholecystitis was associated with cholelithiasis in 42% of the male and 34% of the female cases. Cholecystitis without gallstones was found in 2.5% of the total number of autopsies. It was also found that the incidence of gallstones was higher in the 1923 to 1942 period than in the 1900 to 1922 period, and that there has been a decrease in the sex difference in recent years. In the present series the sex ratio was 2:1 in favour of women, a much lower ratio than is usually reported.

NORMAN S. SKINNER

Histamine by Mouth in the Treatment of Vasomotor Rhinitis.

Grant, J. C., Savignac, R. J. and Hochwald, A.: *New Eng. J. Med.*, 1943, 229: 579.

The authors report good results in the treatment of all except two of thirty cases of vasomotor rhinitis through the use of histamine by mouth. The effective dose varies greatly in different patients, but remains quite constant for each individual. The method used was to start with 1:1,000 dilution and a dose of one drop in a glass of water, and, if no bad effects resulted, this was increased by one drop each day until toxic effects appear. Following this the patient is maintained on a dose just below the toxic level, and since the effect of histamine is transient, this dose is repeated as often as is necessary to control symptoms. Toxic effects which were seen were flushing of the face, severe transient headache, abdominal cramps, increased intensity of nasal symptoms and severe menstrual pain. The drug should be taken on an empty stomach. The successful maintenance dose may vary from one drop of 1:1,000 dilution to twenty-five drops of 1:100 dilution. The average effective dose was five to seven drops of the 1:1,000 dilution. In the majority of the reported cases oral histamine therapy was given after treatment with other methods had been unsuccessful.

NORMAN S. SKINNER

Universal Oedema of the Fetus Unassociated with Erythroblastosis.

Potter, E. L.: *Am. J. Obst. & Gyn.*, 1943, 46: 130.

In a group of 100 infants thought to have erythroblastosis, Potter found only 50 of them to be really exhibiting that condition. Of this 100, 17 showed oedema and so might be classified as hydrops with erythroblastosis. None of the 17 showed true erythroblastosis, and Potter states that in these instances the amount of fluid was much greater in the abdominal and thoracic cavities than is true of erythroblastosis. The organs were hypoplastic, the lungs especially being small. The liver and spleen were not enlarged, and there were few circulating nucleated reds; abnormal haemopoiesis was seldom found. Although the spleen was small, the splenic nodules were well developed in contrast to erythroblastosis, in which the lymphoid tissue of the spleen is reduced or absent. The mothers of these 17 children were all under 30, 6 of them were para-I; 11 of them were tested, and all 11 were found to be Rh positive, whereas 90% of mothers of erythroblastosis infants are Rh negative. Thus the presence of universal oedema in the fetus does not necessarily indicate the presence of erythroblastosis.

MADGE THURLOW MACKLIN

Surgery

The Relation of Trauma to Diabetes. "Les rapports des traumatismes et du diabète". Joslin, E. P.: *Ann. Surg.*, 1943, 117: 607.

Le diabète est une maladie héréditaire caractérisée par un accroissement du sucre dans le sang et son élimination dans l'urine, en relation avec la diminution d'insuline secrétée par les îlots de Langerhans et le fonctionnement d'autres glandes endocrines. Il y a environ 800,000 diabétiques actuellement aux Etats Unis. Leur traitement pose des questions d'assurances assez délicates.

Un traumatisme peut-il causer le diabète? L'auteur examine l'action indirecte qu'il peut avoir et établit l'importance d'un diagnostic en cette matière.

Un diagnostic de diabète ne peut être établi qu'en cas de glycosurie et de glycémie ou d'hyperglycémie. Certains sucres peuvent se trouver dans les urines sans que pour cela il y ait diabète. Tous les moyens d'établir un diagnostic sont essentiels et ne doivent pas être négligés.

Quand un traumatisme survient, il faut établir si le diabète existait avant l'accident ou s'il est uniquement post-traumatique. Le traumatisme est rarement la cause directe du diabète, à moins que le pancréas dans ses 4/5èmes où une autre glande endocrine ne soient particulièrement atteints, (glande pituitaire) et que les cellules productrices d'insuline soient presque détruites.

Le pancréas étant le centre autour duquel le diabète évolue, il faut envisager les cas dans lesquels il peut être atteint, sans qu'il y ait eu pour cela de traumatisme externe: cas de pancréatite, de cancer du pancréas, d'infection bacillaire, etc. L'auteur étudie diverses opinions pour ou contre le traumatisme cause directe du diabète. Il conclut en constatant que le traumatisme active un diabète latent, soit dans son héritéité, soit dans des prédispositions comme l'âge, l'obésité, le manque d'exercice, etc., et que le diabétique avéré est, d'autre part, plus sujet à un traumatisme qu'un non-diabétique, à cause de la plus grande vulnérabilité de ses tissus.

PIERRE SMITH

Sliding or Paraperitoneal Hernia of the Pelvic Colon.

"Hernie par glissement ou para-péritonéale du colon pelvien". Brown, R. K.: *Surg., Gyn. & Obst.*, 1943, 76: 91.

On peut définir la hernie par glissement: protrusion d'un organe herniaire de telle façon que le péritoine du viscère fait partie du sac. En d'autres termes, la hernie fait saillie le long du sac; elle est parapéritonéale. Elle peut sembler être à l'intérieur du sac, mais non complètement entourée par lui.

Il est difficile de faire le diagnostic de la hernie par glissement à la palpation et par les moyens cliniques ordinaires. Elle est généralement diagnostiquée lors de l'opération. Il faut bien faire la différence entre une hernie par glissement et une hernie ordinaire adhérente au sac, car les manœuvres dans le premier cas sont beaucoup plus délicates à cause d'une hémorragie possible.

L'auteur étudie les inconvénients inhérents à différents procédés opératoires. Il indique en terminant sa propre méthode qui permet de bien identifier les éléments anatomiques anormalement disposés et de bien fermer l'anneau inguinal profond. PIERRE SMITH

Intubated Ureterotomy. Davis, D. M.: *Surg., Gyn. & Obst.*, 1943, 76: 513.

A new operation for ureteral and uretero-pelvic stricture is described. Essentially it consists in splitting open the constricted portion of the ureter and putting in place as large a catheter as possible connecting the normal portions above and below. Throughout the length previously occupied by the stricture there is only a more or less narrow band of tissue lying along one side of the catheter. The remaining defect is left for the ureteral mucous membrane to close by encircling the catheter. It has great powers of growth to do so, though the author does not yet know whether or not the new tube of mucous membrane which quickly develops is accompanied by layers of ureteral muscle.

The method was suggested to the author by a case of stricture of the urethra where a poor local condition did not allow him to do an ordinary type of repair. In repair operations of the common duct, also, intubation has become the most satisfactory means of approach when tissue is lacking to perform end to end anastomosis. It seems natural to apply such a proved method to the ureter, which the author has done with complete and enduring success in 5 cases which he reports in detail. No sutures whatever are used. More dependence is placed on natural reparative powers and less on surgical cobbling, which fact in itself predicates success for the operation.

J. R. LACROIX

Air Arthrography in Lesions of the Semilunar Cartilages. Cullen, C. H. and Chance, G. Q.: *Brit. J. Surg.*, 1943, 119: 241.

A method of contrast radiography is described to display the semilunar cartilages, and the conclusions in a series of cases are compared with the diagnoses, on clinical grounds, of the same cases to demonstrate the value of the procedure. Filtered air, 70 to 140 c.c., is injected into the knee joint. The suprapatellar bursa is bandaged from above downwards, to put the air in the joint under pressure. The exact location of the joint space is drawn on the skin after being defined by screening. The rays must pass accurately through the joint space to prevent overlapping shadows. The central rays should pass through the part of cartilage being examined, and this part should be uppermost to ensure maximum air filling.

The x-rays published with the article very clearly visualize several types of cartilage injury. In the series confirmed by operation all fractures and dislocations had been accurately seen on the x-rays. Clinically positive cases had been confirmed and some clinically negative cases had been correctly diagnosed by x-ray alone.

J. R. LACROIX

Obstetrics and Gynaecology

Puerperal Tetanus with a Report of a Case Following Septic Criminal Abortion. Thomas, R. C.: *J. Obst. & Gyn. Brit. Emp.*, 1943, 50: 196.

A case of tetanus following self-induced septic abortion is reported. The abortion was admitted to have been procured by douching with dettol solution every day for a month using a Higginson's syringe

with a bone nozzle, the whole of the nozzle being introduced into the vagina. She stated she never bled while douching. It will be noted that though she stated she had passed the fetus and part of the placenta the day before admission, she already had a high temperature and rapid pulse when admitted, and the placenta was very foul-smelling when removed 2 days later. The date given for the passage of the fetus may not have been correct. Some reference to the literature on puerperal tetanus is made, and the condition of some of the patients comprising nearly 1,000 abortions treated during the past 7 years is described. Although many patients are already septic on admission, and many abortions are admittedly criminally induced in circumstances highly conducive to a variety of infections, the incidence of infection with *B. tetanus* is very rare in this country.

In the case now reported the question arises as to when and by what means the infection with *B. tetanus* was conveyed. The incubation period of tetanus is stated to be 2 to 14 days, but it may be longer, and as a rule a long incubation period means a more favourable prognosis. Usually the spores gain entry through abrasions or wounds which may be so minute as to escape detection. In this case neither wounds or abrasions were seen on the vaginal walls or cervix, but the placental site was the obvious port of entry. Spores could have been introduced at any time during the use of the Higginson's syringe, and although a dettol solution was used this would be very unlikely to have had any effect on tetanus spores, though doubtless it restricted infection of other organisms. The condition of the inner surface of the bulb and tubing of the average Higginson's syringe may well be imagined, and the bone nozzle would be no better.

P. J. KEARNS

Primary Abdominal and Primary Ovarian Pregnancy.

Thomas, R. C.: *J. Obst. & Gyn. Brit. Emp.*, 1943, 50: 189.

Two cases are reported, the first of which is thought to be an instance of primary abdominal pregnancy, the second conforming to Spiegelberg's criteria for primary ovarian pregnancy. Some references are made to the literature on both conditions. The difficulties and dangers encountered in attempts to remove the placenta in such cases, and the propriety of treating the placenta as an absorbable organ to be left *in situ* with closure of the abdomen, are discussed. It is of interest to note that the first patient had hypertension, albuminuria, and oedema, which, coupled with the abdominal pain and brown discharge, led to the erroneous diagnosis of toxic accidental haemorrhage. The correct diagnosis would, no doubt, have been arrived at sooner had the patient not suddenly left hospital against advice, after a stay of only a few days. The toxæmia associated with the ectopic pregnancy improved even in those few days, and cleared up completely after removal of the fetus, although the placenta was left in the abdomen. The placenta could not be felt by bimanual examination 14 months later. The patient with the primary ovarian pregnancy, in whom the correct diagnosis was also missed in the first instance, had a hypertension when first seen, which increased during the next 6 weeks. Its relation to the pregnancy, however, is difficult to assess.

P. J. KEARNS

On the Use of the Willett Clamp for Scalp Traction in Delivery. Kaltreider, D. F. and McNally, H. B.: *Am. J. Obst. & Gyn.*, 1943, 46: 744.

The Willett clamp application to the fetal scalp offers definite advantages over other generally used methods of treatment in certain cases of placenta prævia, premature separation of the placenta and uterine inertia. It is of definite value in the induction of labour, in the prevention of prolapse of the cord or of fetal parts, and in the maintenance of correction of malpresentations of the vertex.

Ninety-four cases are presented, with 9 failures, 6 of which were experimental in transverse positions

of the vertex, the final outcome consisting of 2 mid-forceps, with hysterostomotomy and 4 manual rotations with low forceps. There were 3 failures with uterine inertia. All three were delivered with mid-forceps, in one of which hysterostomotomy was used.

This method has no particular value in the treatment of transverse positions of the vertex. Risk to the baby is minimal.

Ross MITCHELL

Pædiatrics

Amputations in Children. von Saal, F.: *Surg., Gyn. & Obst.*, 1943, **76**: 709.

These are not as common as in adults but are worthy of attention because amputations in children are different. The upper humeral, tibial and fibular epiphyses are all centres of rapid growth and each supplies more than 50% of the growth of its bone. On the other hand the soft parts around the end of the stump have a diminished growth potential and cannot keep up with the elongating bone. The result is frequently that the bone grows out of the soft tissues covered only by thin, tightly stretched skin which may ulcerate and allow the bone to perforate. A series of such cases is described, with photographs. Re-amputation is then required. Prevention is suggested. If the child is 6 years old or more, then an "ideal" length of tibial stump can be obtained—varying from 4 to 7 inches. The epiphysis should be destroyed by removing a large amount of cartilage with a curette, so that further growth is prohibited. Frequent changes of prosthesis are not required when growth occurs entirely above the knee joint. If the child is too young to obtain an ideal length of stump, epiphyseal fusion can be delayed until sufficient growth takes place. Anyone under age 25 may still have an open, growing epiphysis and an x-ray should be taken to determine whether fusion is indicated.

J. R. LACROIX

Oto-Rhino-Laryngology

Nasal Allergy. Bray, G.: *J. Laryng. & Otol.*, 1943, **58**: 219.

This is a discussion of allergy from the point of view of treatment. The author deals with the allergic nose exclusive of hay fever. He believes that the allergic nose should be treated from the general point of view and not by local treatments to the nose itself. All specific irritants must be searched for and dealt with including the inhalants, ingestants, physical agents and infectants. The infecting agencies the author considers of little importance. In diagnosis of nasal allergy the following criteria are used. A history of allergy, pale boggy mucous membrane with mucoid discharge, mucous polyps, drawing of the alæ nasi apart by lip movements, positive skin reaction, eosinophilia, x-rays of the sinuses showing a thickened membrane and an immediate though temporary response to adrenaline or ephedrine. Surgery is of little value in the treatment. The author does not believe in the nasopulmonary reflex on which surgeons have based their treatment. He finds that atropine injections will not improve the asthma seen in these cases and that the asthma becomes more acute after the pressure and obstruction are removed. He believes that the allergic reaction spreads by the lymphatics and hence from the nose by the lymphatic ducts to the superior vena cava and hence to the lung. The author believes that all cases should be treated from the allergic viewpoint and that this will cure the bulk of them.

GUY H. FISK

Osteoclastoma of the Temporal Bone. Lord, O. C. and Stewart, M. J.: *J. Laryng. & Otol.*, 1943, **58**: 263.

A case of benign giant cell tumour of the temporal bone is described in a woman. Only two other cases of this condition have been reported. The patient was 50 years of age and the tumour lasted just over three years after first producing symptoms. The diagnosis was made histologically 1 year after the onset

of symptoms from a recurrent aural polyp. Treatment was by partial excision and radiation. Death occurred two years later from bronchopneumonia. The tumour at autopsy was found to have extended widely in the base of the skull and to have invaded the cerebellum. There was no histological change in any portion and no evidence of metastases was found.

GUY H. FISK

Orthopaedics

Subastragalar Arthrodesis in Fractures of the Os Calcis. Gallie, W. E.: *J. Bone & Joint Surg.*, 1943, **25**: 731.

In this paper Prof. Gallie first discusses the indications for subastragaloïd arthrodesis after os calcis fractures with derangement of the astragalocalcaneal joint. These are: (1) pain through the joint with walking or standing; (2) acute twinges of pain when the heel strikes an uneven surface; (3) marked limitation in the ordinary movements of joint; (4) definite x-ray evidence of irregularity in the articulating surfaces. A simple method for arthrodesis of the joint is then given with excellent illustrations.

The posterior aspect of the joint is exposed by an incision along the lateral aspect of the Achilles tendon. When the joint has been opened a mortice half an inch wide and a quarter of an inch deep is cut in the two articulating surfaces extending forward to the transverse sinus. The knee is then bent and a bone graft two and a half inches by half an inch, is removed from the tibia. This is divided into two parts and driven into the mortice with the cancellous aspects bordering on the walls of the mortice.

The limb is incorporated in a below-knee plaster with the foot at a right angle. The patient gets about on crutches after four to five days, and has the plaster removed in three months. A walking plaster is then used for six weeks. The writer has used the method on fifty cases over a period of six years and claims excellent results.

A. F. MOSELEY

Radiology

The Roentgen Signs of Patent Ductus Arteriosus. Donovan, M. S., Neuhauser, E. B. D. and Sosman, M. C.: *Am. J. Roentgenol. & Radium Ther.*, 1943, **50**: 293.

A patent ductus arteriosus can now be safely ligated or completely divided, which places this congenital lesion among the curable forms of heart disease.

The accurate diagnosis of this condition is now vastly more important than formerly, when it was chiefly of academic interest. The roentgenological signs of patency of the ductus arteriosus have a definite value, although they do not prove the diagnosis, nor does their absence rule it out. In addition, a thorough roentgen study helps the surgeon to evaluate the results of operation.

The roentgen findings in 50 cases of patent ductus arteriosus which were verified by operation are presented. These findings in order of frequency are: (1) dilatation of the pulmonary artery; (2) cardiac enlargement; (3) dilatation of the left auricle; (4) engorgement of the intrapulmonary vessels; (5) exaggerated pulsation of the left ventricle and the pulmonary artery; (6) "hilar dance", or pulsation of the vessels in the hilus of the lungs.

Of interest is the author's use of the table of theoretical normal transverse diameters of the heart, published by Ungerleider and Clark. No computation is involved in the use of this method; one only needs to know the height and weight of the patient. Reference to the table then gives the predicted normal transverse diameter of the heart. At 10% variation above the theoretical normal is allowed before considering the heart enlarged. The writers have found the table reliable and indispensable in heart mensuration.

R. C. BURR

Giant-cell Tumours: Radiation Therapy and Late Results. Gershon-Cohen, J.: *Radiology*, 1943, 41: 111, 267.

The late results of roentgen irradiation of giant-cell tumours are good. Including those giant-cell tumours that are malignant from the beginning, or that undergo malignant change, sometimes many years after treatment, the percentage of cures with irradiation alone is high, possibly more than 85%. There are apparently less morbidity and a better recalcification of the tumour after irradiation than after surgery. The complications of recurrence and infection following surgery are avoided with irradiation. Fractures occur with any treatment, surgery or irradiation, and can be avoided largely by avoidance of all weight-bearing stresses for a sufficiently long period. Patience must be exercised during the early stages of irradiation treatment, as recalcification may be delayed for many months. The doses of radiation need not be too large, nor given over too long a period of time.

R. C. BURR

Anæsthesia

Evaluation of Nitrous Oxide Anæsthesia. Gould, R. B.: *Brit. M. J.*, 1943, 2: 607.

Nitrous oxide has been usually considered the safest and best anæsthetic agent. At the present time, when non-experts in increasing numbers are being called upon to act as anæsthetists in both military and civil practice, a critical examination of this statement is necessary.

Nitrous oxide is a weak anæsthetic agent whose effects are often produced only in the presence of anoxia. It is rather an agent for the production of unconsciousness than one which can provide any degree of muscular relaxation. Any attempt to produce unconsciousness in many anæsthetic-resistant patients and the production of relaxation in nearly all cases is usually accompanied by such a degree of anoxia as may often be dangerous.

The author cites the three main arguments used by Clement in recommending the use of nitrous oxide when its use must often imply considerable oxygen want. These are (1) "that anæsthetic agents in general produce their effects by reduced oxygen utilization and nitrous oxide in particular by the exclusion of oxygen in the inspired air; (2) that nitrous oxide is an indifferent inert gas without any direct action or effect upon the body tissues, and that therefore it may be assumed that any additional effect of anoxia on the tissues will be minimal, if not harmless, and (3) that the body shows a remarkable tolerance to moderate and even temporary severe, degrees of oxygen want."

Against these arguments the author brings forward considerable convincing evidence to the contrary. He also deals with the subject of cyanosis and maintains that, even though it may not always indicate anoxia, unless the haemoglobin concentration of any surgical patient is known to be above normal the possibility of cyanosis occurring without anoxæmia may be ignored. It would appear therefore that the only way to avoid anoxæmia is to maintain scarlet blood in all cases. Clement claims that this latter stipulation is impossible with nitrous oxide if narcosis is to be produced in the majority of patients. Hence this conclusion must have a profound effect upon the evaluation of nitrous oxide, as an anæsthetic agent, as the author maintains that he would regard the presence of a pink skin and scarlet blood as essential in all cases. Some alternative to cyanosis must be found.

Other methods of increasing the potency of nitrous oxide are available and are to be preferred. This may consist of adding enough ether to the mixture of nitrous oxide and oxygen to maintain an adequately high percentage of oxygen, or preferably using it with a combination of other agents in order to "potentiate" it. (This would include avertin or sodium pentothal.—Abstractor's note.)

F. ARTHUR H. WILKINSON

Therapeutics

Artificially Induced Fever as a Therapeutic Procedure. Carson, W. R.: *Psych. Quart.*, 1943, 17: 604.

The author reports the results obtained by the use of artificial fever therapy as employed in a state hospital over a period of 11 years. The majority of cases treated were those which had neurosyphilis. The treatment was given once a week and consisted of five hours of fever, three hours above 103.6° F., and two hours at or over 106° F. Each patient received about 15 treatments. Of 122 cases of general paresis treated in this manner some improvement was noted in 67%. There is an estimated remission rate of 46.5%. Of 17 cases of cerebral syphilis treated there was some improvement noted in 76%. There is an estimated remission rate of 53%. Patients suffering from pulmonary tuberculosis and general paresis have been treated by fever without any apparent harm to their chest conditions. It is concluded that the optimum hours of fever in the treatment of general paresis are 70, with two-fifths of this period at a temperature of 106° F. or over.

Artificial fever is a comparatively safe procedure, but requires the supervision of trained personnel. In those cases of general paresis having a history of convulsive seizures phenobarbital has been used before and during artificial fever treatment. In all such cases treatment has been successfully concluded without complications. These results are in marked contrast with those which were obtained prior to the use of malaria, tryparsamide and artificial fever, when general paresis was a fatal disease and over 90% of the patients admitted to hospitals died within a few years.

BARUCH SILVERMAN

Treatment of Subacute Bacterial Endocarditis. Current Results. Lichtman, S. S.: *Ann. Int. Med.*, 1943, 19: 787.

The results of current methods of treatment of subacute bacterial endocarditis are disappointing. However, a small but significant number of patients recover.

The recovery rate among a total of 704 cases was found to average 5.5%. Of 489 cases treated with sulfonamide chemotherapy, 21 recovered, for an incidence of 4%. Of the remaining 215 patients treated by chemotherapy, supplemented by heparin or fever therapy, 18 recovered, for an incidence of 8.5%.

The incidence of spontaneous recovery in subacute bacterial endocarditis is estimated at approximately 1%. It may be significant, then, that 61 patients treated with artificial fever, 4 recovered, or an incidence of 6.5%. In 109 patients heparinized the incidence of recovery was the same, or 6.5%.

It is worthy of note that surgical ligation performed on patients with patent ductus arteriosus complicated by subacute bacterial endocarditis produced the highest percentage of recoveries.

Until methods of treatment and results are improved further, every patient with subacute bacterial endocarditis should receive intensive sulfonamide chemotherapy to tolerance. The choice of supplementary therapeutic measures rests at present with individual preference.

S. R. TOWNSEND

Allergic Reactions to Liver Extract. Kaufman, R. E. et al.: *Ann. Int. Med.*, 1943, 19: 768.

Eleven cases are added to the already existing literature of allergic reactions to liver extract. Reactions usually occur after numerous well tolerated injections and after a long injection-free period. The amount or manufacture of the liver extract given does not appear to have any constant relationship.

The clinical manifestations are varied and may include every allergic sign and symptom. Intracutaneous tests are usually positive. The exact nature of the substance in liver extract precipitating the reaction is not clear.

Desensitization with gradually increasing doses of diluted liver extract is recommended for patients who react frequently.

S. R. TOWNSEND

Pathology and Experimental Medicine

Hypertensive Disease of the Brain. Scheinker, M.: *Arch. Path.*, 1943, **36**: 289.

The author describes the characteristic histological features of hypertensive encephalopathy based on a study of 25 cases, two of which are described in detail. The typical vascular lesions observed in all cases were confined to the arterioles and capillaries. These changes ranged from a little subendothelial thickening and hyalinization, to a widespread diffuse thickening, hyalinization and homogenization of the vessel walls. They were associated with various degrees of narrowing and obliteration of the vessel lumina, with some fibrous thickening of the perivascular connective tissue, and some focalized areas of perivascular lymphocytic infiltration. These arteriolar changes in the brain are similar to those occurring in the kidney. They should be considered a specific vascular disease, and should be distinguished from arteriosclerosis. The term "hypertensive hyaline arteriolopathy" is suggested. A working hypothesis assumes these structural changes of arterioles to be due to functional vascular disturbance of prolonged duration or of repeated occurrence. The changes in the parenchyma of the brain are considered secondary to these arteriolar lesions. The principal alterations consisted of numerous diffusely scattered circumscribed small foci of softening, chiefly confined to the vicinity of small blood vessels in the cortical ribbon. These foci showed destruction of nerve tissue and replacement by gitter cells full of debris and pigment granules. Older foci of destruction were represented by circumscribed areas of glial scarring. Other parenchymal changes were small foci of perivascular haemorrhage, massive haemorrhage, and diffuse or localized oedema of the brain.

HARRY STARR

Spontaneous Rupture of the Normal Spleen. Brines, O. A.: *Arch. Path.*, 1943, **36**: 163.

Whereas spontaneous or non-traumatic rupture of a diseased spleen is not uncommon, spontaneous rupture of a previously normal spleen is a rare and often controversial diagnosis. This is because it is often difficult, firstly, to eliminate the possibility of minor trauma, and, secondly, to decide whether the spleen was previously normal or not. Accordingly, the following definition is proposed: "The diagnosis spontaneous rupture of the normal spleen means that the spleen on careful pathological examination is found to be free from disease and that no history of injury can be elicited, other than the movements or physiological strains which are a part of the daily life of the average person." On the basis of these rather liberal criteria, the author collected 35 cases from the literature, though it is admitted that there might be valid reason to exclude 11 of these cases.

A case report is added of a thirty-five year old negro who gave a history of a dull ache in the left lower chest anteriorly starting on the morning of admission. Within a half hour the pain became so sharp that he could not stand upright. It moved down to the umbilicus with radiation to the left lower quadrant. There was nausea but no vomiting. There was no history of trauma. Examination showed a haemoglobin of 60%, diminution of excursion of both lung bases, and slight elevation of the left leaf of the diaphragm. The diagnosis was missed. A laparotomy performed two days after admission showed the abdomen to be full of blood and a ruptured spleen was successfully removed. The spleen weighed 130 grm. and had a linear tear through the capsule from the hilus to the margin with some engorgement of the parenchyma, and haemorrhagic extravasation in the vicinity of the laceration. There was no evidence of pre-existing disease.

HARRY STARR

The Diet in Germany and the Occupied Countries During the Second World War. Spicknall, C. G., Fishburn, H. D. and Baum, W. S.: *Pub. Health Reports*, 1943, **58**: 1669.

The writers were in Germany between August, 1941 and May, 1942, that is to say approximately four months before the entry of the U.S.A. into the war and five months afterwards. The day after England and France declared war on Germany food rationing was begun in Germany. It is evident that all preparations had been made for this eventuality. But even before the war consumption of food in Germany had been restricted so that transition was less difficult to the German citizens than to foreigners living in Germany.

The diet is given in some detail for the civilian population and the prisoners of war. Some information was also obtained regarding the diet of occupied countries. The picture given is rather different from that obtained by reading press reports. Although one gets the impression that the diet of the German people is inadequate, it appears to be less inadequate than is commonly believed. The authors do state that much of the food is very unpalatable to one who has not become accustomed to it. "Ersatz" coffee, for example is described as having only warmth to make it palatable. A large part of the marmalade was said to consist partly or wholly of turnips with artificial colouring and flavour added making a preparation that was very unpalatable.

FRANK G. PEDLEY

Hygiene and Public Health

Will Divorce Increase in the Postwar Years? Statistical Bulletin, Metropolitan Life Insurance Co., 1943, **24**: 3.

Immediately after the close of the last war the divorce rate jumped in the United States to the highest point it had reached. France and England had a similar experience, whereas the Scandinavian countries, which were nonbelligerent, reported comparatively minor increases.

The special factors which lead to an increase in divorce following war are: (1) Hasty marriages contracted under the stress of wartime emotions; (2) prolonged separation of husbands and wives; (3) the increased industrialization of women, and (4) increased urbanization of the population.

The year 1920 marked the peak of divorces in the U.S.A. up to that time. This was followed by a brief decline. By 1929 the divorce rate had climbed to the 1920 level (165 per 1,000 marriages). A decline followed this second rise, reaching 137 divorces per 1,000 marriages in 1932. Since 1932, however, the divorce rate has been mounting steadily. In 1940 the rate was 212 per 1,000 marriages.

FRANK G. PEDLEY

The Effectiveness of Typhoid Vaccine Prepared by the U.S. Army. Callender, G. R. and Luippold, G. F.: *J. Am. M. Ass.*, 1943, **123**: 319.

The experience of the U.S. army with typhoid vaccine is as follows: From 1909 to 1916 a monovalent typhoid vaccine was used (Rawlings' strain). From 1917 to 1927 paratyphoid A and B were added making the so-called triple TAB vaccine. In 1928 para B was omitted and in 1934 para A. In September, 1940, the paratyphoid A and B components were returned to the vaccine. In 1934 after exhaustive studies of immunogenic properties the Rawlings' strain of typhoid bacilli was changed to a more potent strain commonly referred to as Panama 58. This is the strain now in use. Studies on mice have indicated that it is more immunogenic than the old Rawlings' strain and seems to afford protection against a rather wide range of typhoid strains.

The morbidity experience of the U.S. army from typhoid fever is given in a graph covering the years 1860 to 1942. This indicates an excessively high rate during the civil war and the Spanish war and rates

only a fraction of these during the first world war and the present war.

After the entrance of the U.S. into the first world war in 1917 the morbidity rate, which had been higher than usual in 1916 on the occasion of the Mexican mobilization (1.2 per 1,000 per annum), dropped to 0.7 per 1,000 in 1917; 0.4 in 1918; and 0.6 in 1919. Thereafter it dropped to well below 0.1 per 1,000 and continued so with one exception. Typhoid rates at the present time are insignificant in spite of the fact that the rates for diarrhoeal diseases have been rising.

FRANK G. PEDLEY

Obituaries

Dr. Leo Erol Pariseau, a leading radiologist for the past quarter-century, died on January 10 at the Hôtel-Dieu at the age of 62 years after a long illness.

Born at Grenville on May 24, 1882, Dr. Pariseau was the son of the late L. S. Pariseau, civil engineer, and Mrs. Pariseau, formerly Miss Lawlor. As a professor in the Ecole Polytechnique of Montreal, Dr. Pariseau was among the first Canadians to specialize in radiology. During the Great War he served as radiologist at the Laval Hospital at St. Cloud from 1914 to 1918 and returning to Canada after the armistice he was appointed radiologist at the Hôtel-Dieu, holding that position until a few years ago when ill-health forced him to retire. Founder of the *Hôtel-Dieu Journal*, Dr. Pariseau was the author of many articles on scientific and historical subjects. He was an accomplished bi-lingual speaker. He possessed a large library on the history of medicine, which is to be installed in the new University of Montreal.

Dr. Pariseau married Yvonne Hebert, daughter of the sculptor, Louis Philippe Hebert, in 1919 and she survives him, as do five sisters, and one brother.

AN APPRECIATION

The passing of Leo E. Pariseau has removed from the medical world a most distinguished member. A spirited character, and endowed with a high sense of honour and duty as well as an extensive knowledge in various fields of thought, he rightly earned a reputation as a colourful public speaker and a writer of note.

Electro-radiology was his special medical activity and he made numerous contributions on the subject. For these and for his qualities as a man, he acquired the admiration of the medical profession at large which has been highly justified.

In the face of successive and long illnesses his resignation was dignified and noble. His daily contacts with x-rays and radium in diagnosis and treatment of diseases had cost him dearly and his unstinted devotion towards the sick was the cause of the loss of an eye and severe, painful chronic roentgen ulcers of the fingers. In fact, a few months previous to his death he submitted to an amputation of the left index finger where already neoplastic changes had set in. The pulmonary metastases nevertheless to which he finally succumbed were in no way related to this lesion.

His interest in radiology dates back to 1908 when as professor of electricity at L'Ecole Polytechnique de Montreal he explored the technical and medical possibilities of this promising method. He may be considered as one of its foremost pioneers in Canada.

At the outbreak of the last war, Dr. Pariseau was established in Sherbrooke, Que., where he also was acting in the capacity of public health officer. He relinquished his post and immediately volunteered for service in the army being assigned as radiologist to the Hôpital Laval de St. Cloud throughout the whole period of hostilities. Demobilization followed and Major Pariseau assumed the position of radiologist-in-chief at the Hôtel-Dieu de Montréal. This post he

occupied until 1938 when due to ill health he was forced to retire.

In 1932, in association with three colleagues of his hospital, he founded *Le Journal de l'Hôtel-Dieu*. For the greater part of twelve years he was its editor-in-chief, the body and soul of the publication. As a writer his activities were tremendous, for Dr. Pariseau was the author of numerous topics on science, history, medical ethics, sociology, bibliography, etc. His literary works would easily make up many volumes. He was a translator of note. The French version of three volumes of *Annals of Roentgenology* was indeed a remarkable feat.

A consistent worker, as well as a brilliant lecturer, he made his influence felt by frequent public utterances before scientific and historical societies. His presentations were noted for their accurate documentation as well as the illuminating demonstrations which often-times embodied entirely new and convincing experiments.

His make-up was that of a soldier; never a moment did he hesitate, whenever he deemed it necessary, to uphold the honour and dignity of the profession, to throw himself wholeheartedly and with vigour into the fight. He played an important rôle in many notable lawsuits, in the interest of medical ethics and in defense of the fraternity against the practice of quackery. 'Tis true, he swaggered along, elated by his lofty ideals, but he was neither a Cyrano nor a Don Quixote. One had only to listen to him in private conversation, to realize that it was his serious outlook on things which was the basis of his interferences; and that at no time, could one doubt that he was swayed by motives that were unselfish and chivalrous.

He maintained his opinions most forcibly and sometimes even violently, but would readily recognize in an opponent who knew how to put up a good fight the qualities of the man—and maybe then, the conversation would continue its course in a most friendly spirit, intermingled with anecdotes, followed up by frequent citations which would drive home his point. To him who considered time such a precious thing, he did not hesitate, even when in physical pain, to give himself entirely to his friends and enjoy their conversation during many long hours. It was customary for him to receive in his magnificent library, a great collection indeed of old and modern books, comprising all forms of human knowledge, chosen with much intelligence and loving care, where Dr. Pariseau, without leaving his home, could verify the important facts of history and science from Aristotle to our times. At various meetings, by means of his own books, he would introduce the whole historical background of the feature topics which were up for discussion and study.

He saw to it before his death that this marvellous collection should not find its way into the hands of the dealers but would be handed on to become the property of the University of Montreal. This institution now is the proud possessor of the Pariseau Library, as McGill contains the Osler Library. A few hours before his death, in a soft and hesitant voice, he repeated to those about him how happy he was to have his wish finally realized. Such a sense of service, even after death, shows the greatness and loftiness of view of Dr. Pariseau. The outcome of this generosity may well be the foundation of a chair of history of the sciences. Thus the great master, who was amongst us and whose loss we deeply feel, will continue in the mystery of eternity to stimulate the love of study and research for generations to come.

Throughout his illness, by means of frequent radiograms, he himself attentively followed the progress of dissemination of neoplastic changes which had already reached his lungs. With much stoicism and a most edifying calmness he watched the various stages, knowing quite well the inevitable issue. Racing with death, dominating pain and partly suffocating, he husbanded his last bit of strength in preparing the catalogue for his library and in setting up the list of what constituted his laboratories of chemistry and

physics which he also bequeathed to the University of Montreal. When this was finally attended to, he laid himself down to die. Clear in mind and light of heart he awaited without fear to be delivered from this earth and then, with much simplicity and dignity, he gladly passed to the great Beyond, grateful for the affection and care shown him.

There is no reason to despair, if of such men humanity is made.

ALBERT JUTRAS.

Dr. E. B. Balfour, Lucknow, Ont., died on November 19, 1943. He was a graduate of Western University (1907).

Dr. Charles G. S. Baronsfeather, of Edmonton, Alta., died January 2, 1944. He was born in Ireland and graduated in Dublin from Trinity College where he took degrees in arts, law and medicine, preparatory to going to China as a medical missionary.

After strenuous work in China for ten years, his health broke down and he went to Bournemouth, England, where he regained his health and commenced the practice of medicine. Some years later in 1930, he came to Canada, registered in Alberta, and opened an office in Edmonton, where he built up and enjoyed a good family practice. He leaves a widow, one daughter and one son to mourn his loss.

Dr. George Victor Bedford, of Winnipeg, died suddenly on January 6, 1944. He was born on August 31, 1887, at Emerson, where his father was a pioneer physician. As a young man he was an expert baseball pitcher. He graduated from Manitoba Medical College in 1912 and practised at Morden, at first in partnership with the late Dr. B. J. McConnell. In 1916 he proceeded overseas as M.O. to the 61st Battalion, and later was on the staff of Granville Canadian Military Hospital at Ramsgate. In 1917 he returned to Winnipeg and held an appointment in Tuxedo Military Hospital until 1921. In 1919 he became demonstrator in therapeutic medicine in the faculty of Medicine, University of Manitoba; in 1928, demonstrator in medicine; and in 1930 lecturer in medicine. In 1926 he took a postgraduate course in dermatology in London and since then had practised that specialty. From 1931 till his death he was associate dermatologist to the Winnipeg General Hospital. He is survived by his widow and two daughters.

His athletic figure and courtly manners distinguished him. He was keenly interested in some of the unsolved problems of his special field of medicine and did some original work, especially in connection with psoriasis.

Dr. Cassius Wilkinson Belton, Toronto, Ont., died on December 6, 1943. He was born in 1861 and was a graduate of Trinity University (1881).

Dr. Sherman W. Burgess died at his home in Moncton, N.B., on December 13, 1943, following a sudden seizure in the course of an illness lasting for two months. Dr. Burgess was born in Apohaqui seventy-seven years ago. Following graduation from Bellevue Medical School in New York he practised in Shemogue for ten years. For the last forty years his practice was in Moncton, where he specialized in diseases of the eye, ear, nose and throat. His referred work came from a wide district in eastern New Brunswick. He was a fellow of the American College of Surgeons, and was held in high esteem both professionally and as a citizen.

Dr. Robert Wellington Clark, Bowmanville, Ont., died on December 5, 1943. He was born in 1877 and was a graduate of the University of Toronto (1918).

Dr. Norman Wells Connolly, of Stettler, Alta., passed away following a heart attack, on November 30, 1943, at the age of 66 years. He leaves a widow and daughter, Mrs. Ronald Horner, to mourn his sudden

passing. He was a graduate of Queen's University, Kingston, in 1908.

He practised some years at Wayne under a mine contract, then moved to Stettler, where he practised until his death. In 1911, he took the examinations and registered in Alberta, going to a contract practice in Blairmore, from which place he went to Wayne.

He was born at Waterloo, Quebec, in 1877, and was the son of the Rev. Daniel Connolly. He leaves a widow and three daughters.

Dr. William Sydney Fawns, Toronto, Ont., died on October 29, 1943. He was born in 1877 and was a graduate of the University of Toronto (1903).

Dr. Angus Alexander Ferguson, of Morrinville, Alta., passed away after a short illness on November 1, 1943, in Edmonton. Graduating from Queen's University (1904), he felt the call of the West, and settled north of Edmonton, in the district then known as Rivière Qui Barre (the river that blocked). Later, when the Canadian National Railways built their road to Athabasca, he moved to what became the town of Morrinville, where he practised until his death. He was a family physician in every sense of the word. For almost 40 years, he served these pioneers, and notwithstanding roads or no roads, fine or inclement weather, he went when and where needed and rendered aid in no stinted manner. He was 63 years of age.

Dr. James Gow, Windsor, Ont., died on October 14, 1943. He was a graduate of the University of Toronto (1899).

Dr. Harry Thomas Hogan died suddenly on December 9, 1943, at Young, Sask., where he had very recently opened a practice. He was a graduate of Queen's University (1936); was registered with the College of Physicians and Surgeons of British Columbia in 1937, and with the Saskatchewan College on October 11, 1939. Dr. Hogan was in active service for a period of two years, having received his discharge in August, 1943.

Dr. David Alexander Hopper, Waterdown, Ont., died on September 10, 1943. He was born in 1880 and was a graduate of the University of Toronto (1910).

Dr. Thomas Kerr, who practised in the Dovercourt-Bloor area for almost 50 years, died in his sleep of a heart attack early on January 7 at his home in Toronto. He was in his 79th year.

Born in Elora in 1866, son of the late Mr. and Mrs. William Kerr, he graduated from Trinity Medical College in 1899. For many years he was a familiar figure as he visited his patients with a horse and buggy, and, later, a bicycle. He was an ardent angler.

He was the first elder of Dovercourt Road Presbyterian Church when the congregation met in Kelly's feed store, north of Bloor Street. He held that position at the time of his death.

He is survived by his widow, a daughter, four brothers, and a sister.

Dr. James Alexander Millican, of Calgary, Alta., died on January 3, 1944, in his 80th year. Born in Belwood, Ont., he received his education in that province, graduating in Victoria University in 1888. After his internship, he registered in Ontario in 1889, where he practised for some time. Later he went to Chicago, where he opened an office. He took up special work in the eye, ear, nose, and throat. He registered with the College of Physicians and Surgeons of Alberta in 1906, but did not come to Alberta until 1910, when he commenced his specialty in Calgary, where he continued to practise until the time of his death. He was a well trained and capable physician. He will be greatly missed by a host of patients and friends. He leaves a widow, a son and a daughter.

Dr. Edward Arthur Mulligan. The death occurred suddenly at his home at Maniwaki, Que., on November 14, 1943, of Dr. Mulligan in his 76th year. He was born at Aylmer, Que., in 1868, son of the late James Mulligan and Margaret Kernahan. He received his education at Trinity School, Port Hope, and later at McGill University, where he graduated in 1890. He came to Maniwaki in November of the same year and has carried on general practice since.

He was physician to the Indians for 45 years and also served as coroner of this district for several years. His loss will be felt by every member of the community, and he was a special friend of the children, who always looked for him to greet him. He was an ardent fisherman and hunter and one of the founders of the Bras Coupé Fish and Game Club. He was also an honorary member of the Turtle, Pythona, Trout Lake, and Petawaugma Fish and Game Clubs. He was also an enthusiastic football fan and attended every game of the season at Ottawa. He played on McGill football team for four years of his college life and was captain of the team in his final year. He was a great lover of horses and was instrumental in bringing many thoroughbreds to race here.

He is survived by his widow, a son, three daughters, a sister and a brother.

Dr. Harry Morton Murdoff, of Winnipeg, died in the Winnipeg General Hospital on January 1, 1944, in his 66th year. Born in Picton, Ont., he received his early schooling there and then came to Winnipeg as a young boy. In 1905 he graduated from Manitoba Medical College and spent a year as intern in the Winnipeg General Hospital. His postgraduate experience was gained in London, Johns Hopkins University, and other medical centres. He became a Fellow of the American College of Physicians, a demonstrator in clinical medicine in the University of Manitoba, and a member of the medical staff of Winnipeg General Hospital from 1915 to 1928. Later, he became chief of medicine in the Misericordia Hospital, and at the time of his death was honorary chief of medicine there. He is survived by his widow.

He was an able diagnostician, particularly of neurological conditions, and had a wide circle of friends.

Dr. Thomas Talmage D. Orme, Lucan, Ont., died on September 21, 1943. He was a graduate of Western University, 1898.

Dr. Henry Hempton Pirie, Dundas, Ont., died on December 13, 1943. He was a graduate of Queen's University (1890).

Dr. W. P. St. Charles, Toronto, Ont., died on December 15, 1943. He was a graduate of Trinity University (1896).

Surgeon Cmdr. Francis Joseph Scully, chief medical officer of the R.C.N.V.R. and well-known in the medical profession, died suddenly on December 18 in the Western division of the Montreal General Hospital.

Commander Scully had a bad attack of influenza and pneumonia at the end of last month, but was anxious to get back to his duties. He resumed them while still in a weakened condition, to such an extent that he overtaxed his strength.

Born at Saint John in 1863, Commander Scully was the son of the late Hon. William E. Scully, former M.P. and chairman of the Saint John Harbor Commission, and Mrs. Scully. He received his primary education at St. Francis Xavier College, Antigonish, N.S., winning the gold medal in Arts. He then attended McGill University and obtained his medical degree in 1917, enlisting in the Royal Canadian Army Medical Corps and proceeding overseas immediately after graduation. He served on a hospital ship, and subsequently went with the Canadian Expeditionary Force to Russia, being in charge of a Canadian hospital at Vladivostock. After being there for a couple of years he returned to Canada

and served on the staff of St. Anne's Military Hospital for two years. He was also on the staff of St. Mary's Hospital.

When the present war broke out he enlisted in the Royal Canadian Naval Volunteer Reserve as a surgeon lieutenant, and at the same time his only son, Lieut. William Scully, also enrolled in the navy, so that father and son were on active service at the same time. He was promoted to lieutenant-commander, and was gazetted to commander just 24 hours before his death.

Surviving are his widow, a son, a daughter, and three sisters.

Dr. Thomas John Simpson, of Collingwood, Ont., died on September 14, 1943. He was born in 1890 and was a graduate of the University of Toronto (1915).

Dr. Philo William Taylor, of Montreal, Que., died on December 25, 1943, in his 66th year. He was born in Madoc, Ont., and graduated from Trinity University, Toronto, in 1903. He went overseas in the first Great War and served in the Royal Army Medical Corps, gaining the rank of captain. He was active in C.P.C. work in Montreal.

He is survived by his widow and five sisters.

Dr. Walter A. Thomson, of London, Ont., died on December 13, 1943. He was a graduate of Trinity University, Toronto (1891).

Dr. Thomas Henderson Whitelaw, formerly of Edmonton, passed away in his new home at Guelph, Ont., on November 8, 1943, in the 76th year of his age.

He graduated from the University of Toronto in 1894 in medicine, having previously taken his degree in Arts when he took honours in higher mathematics. On graduation, he registered in Ontario and commenced to practise there immediately. He came west and registered in the North West territories in 1898, settling in Edmonton. Ten years later, in 1908, he was appointed Medical Health Officer for the City of Edmonton, which position he held for about 21 years. After retiring from that position, he commenced private practice again, and continued thus until he went to Guelph about 5 years ago.

He was an outstanding citizen and entered wholeheartedly in the various community enterprises and was a staunch supporter of the Church. His widow and one son survive him.

News Items

Alberta

Major J. W. Bridge, R.C.A.M.C. Edmonton, has received the M.B.E. (Military Division).

The new Colonel Belcher Hospital, Calgary, was officially opened on December 9, 1943, by the Honourable Ian MacKenzie, Minister of Pensions and National Health. Dr. A. W. Park, district administrator, presided over the ceremony.

This fine edifice is situated on the grounds owned by the late Senator Patrick Burns, and will accommodate two hundred patients. A new wing to this hospital, to be known as the Harold McDonald Memorial wing will be added. This is in memory of the late Brigadier H. F. McDonald, C.M.G., D.S.O. He was chairman of the Canadian Pensions' Commission, and chief executive assistant to Air Minister Power, who died at his home in Banff early in September, 1943. He was Officer Commanding Military District No. 13, at Calgary in 1918.

The elections of members to the Council of the College of Physicians and Surgeons was held in December, 1943, on the plan of the Royal College of Surgeons, England.

It was a secret ballot; no one knew who voted for anyone. The results were as follows: District No. 1, Dr. D. N. MacCharles, Medicine Hat; District No. 3, Dr. R. Parsons, Red Deer; District No. 5, Dr. A. E. Archer, Lamont; District No. 7, Dr. T. H. Field, Edmonton. Dr. MacCharles, a new member of the Council, is the immediate past-president of the Provincial Association.

The regular meeting of the Council of the College of Physicians and Surgeons of Alberta was held in Edmonton, January 17, 1944, when several important matters came before them. The rationing of liquor has caused pressure to be placed on the medical profession to issue special prescriptions. To the credit of the profession, it may be said that during November the liquor prescriptions filled by the liquor vendor did not average one and one-quarter per physician.

The increased number of soldiers' dependents who are being cared for requires a definite understanding as to the fees paid by the Government. At the present time, voluntary committees deal with the matter without a definite basis, which leaves much to be desired in the matter of understanding. It seems to be a matter of bargaining as to the settlement of the physicians' accounts, with the suggestion that they take less after a nominal fee has been charged.

It is nine years since a schedule of fees was last adopted and it is thought the time is ripe for a revision, not that they will be positive, but as a guide to members of the profession in Alberta.

Should all provinces refuse to register an applicant when once the man has been refused registration in one province? This question has been raised by an eastern province and will be discussed by the Council.

Should life insurance companies be asked to pay the regulation fee for examination on all reports whether given on the man's knowledge of the patient, or by special examination? This question has been brought to the attention of the Council.

In 1919, the first municipal hospital was erected in Alberta, and by 1932 there were 22 municipal hospitals in this province. These hospitals were erected after a favourable vote of the people in the planned hospital districts and are financed by the ratepayers; both as to erection and upkeep through taxation. A ratepayer however, has a hospital rate of one dollar per day, and those who are not ratepayers may enjoy the same privileges by paying a certain sum annually which is usually \$6.00 per year. By September, 1943, the acreage under this hospital plan was 13,352,600 acres with an assessed value of \$133,760,948 covering a population of approximately 165,000 persons.

Recently the following new hospitals have been erected or are in the process of construction: Brooks, capacity of 25 beds, serving a population of 5,500 persons; Taber, capacity of 46 beds, serving a population of 8,000 persons; Olds, capacity of 20 beds, serving a population of 6,000 persons; Raymond, capacity of 15 beds, serving a population of 5,000 persons; Eckville, capacity of 15 beds, serving a population of 4,000 persons.

Didsbury is voting on a scheme for a municipal hospital and Magrath is enlarging its hospital while Beaverlodge has taken over the west district hospital and will enlarge it soon.

G. E. LEARMONT

British Columbia

British Columbia has lost by death Drs. W. F. Drysdale, of Nanaimo, Robert Elliot, of Parksville, J. A. Montgomery, of Vancouver and Joseph Olivier, recently of White Rock. None of these has been actively engaged in practice during several years although they have made a contribution to the medical life in British Columbia.

Dr. W. F. Drysdale came to the Province in 1897 and has continuously practised in Nanaimo during forty-six years. He was well-known on Vancouver Island and highly respected by his colleagues. At meetings of the Upper Island Medical Association, of which he has been Honorary President, he had 100% attendance record. He has strongly supported organized medicine and was honoured in 1941 in having Senior Membership conferred upon him at the Winnipeg meeting of the Canadian Medical Association.

Dr. Robert Elliot, of Parksville, had practised in the Province for many years. He has two sons both serving as Medical Officers with the Forces—Surg.-Lt. R. F. Elliot and Surg.-Lt. W. J. Elliot.

Dr. J. A. Montgomery came to Vancouver after honourable service in the last war and made a fine place for himself in that community, as well as among his colleagues.

Dr. Joseph Olivier was well known in Alberta, having practised there for years before coming to British Columbia where he practised in Creston before returning to Alberta, and latterly practising at White Rock in British Columbia.

Major Thomas Miller, V.D., who has recently retired from active service in the Pacific Command, where he has been for many years the Commanding Officer of the Hygiene Section, was included in the New Year's honours, when he received Membership in the Order of the British Empire as a deserved recognition of his valued service.

A plan for hospitalization sponsored by the British Columbia Hospital Association is being launched in the lower coastal mainland area and in Victoria, where ten hospitals will provide the service. It is patterned after the Blue Cross Plan and is known as the Associated Hospital Services. At its inception membership will be offered only to groups of employees, a certain percentage being demanded, contingent upon the size of the group. A very wide service is offered, limited only by the facilities at the hospitals.

Hospital associations have been operating in British Columbia during the past ten years, the plan having been introduced in Kamloops where it has been highly successful. Kelowna has had an excellent Association during a number of years, and other places, such as Vernon, Penticton, Salmon Arm, Nelson, have also operated similar Associations. The spread of this new organization through the Province will be facilitated by these past experiences and by the record established by the Medical Services Association, which operates among nearly 100 groups in industry, and will make such a plan acceptable and welcome as a complementary service.

The Committee on Medical Education in British Columbia has been extended to include a representative group which is interested in the establishment of a Faculty of Medicine in British Columbia. Several meetings have been held and the Committee is applying itself with some enthusiasm and optimism. The need is recognized and all are interested.

The Committee on Epidemics in British Columbia is well organized and holding meetings in conformity with the general plan of the National Committee, of which our Chairman, Dr. G. O. Matthews is a member. Dr. Matthews has surrounded himself by members representing the Department of Pensions and National Health, the Provincial Board of Health, the Canadian Red Cross Society, St. John Ambulance Association, Indian Affairs Branch of the Department of Mines and Resources, the British Columbia Hospital Association, the British Columbia Registered Nurses' Association, as well as members of the British Columbia Medical Association.

M. W. THOMAS,
for J. H. MacDermot

Manitoba

At the request of the Chairman and Executive of the Sanatorium Board, Dr. E. L. Ross, Medical Superintendent, has drawn up a five-year plan against tuberculosis. The plan includes a survey of all the public health resources. It is to be a case of combined operations, and the target is that everyone in Manitoba shall be given an x-ray chest examination within five years. The schedule calls for 105,000 free x-ray examinations a year, 30,000 in the city of Winnipeg and 75,000 outside the city. This will in all probability result in the finding of at least 100 to 150 unsuspected cases a year during the first year. It is hoped that the succeeding years will find a steadily diminishing number of new cases, since sanatorium treatment will be given to those who are infective.

Lieut.-Col. B. L. Guyatt, R.C.A.M.C., of Toronto, was a welcome visitor at the meeting of the Winnipeg Medical Society on December 17. He is here to take up his post as officer commanding No. 3 Casualty Retraining Centre which is to open in the near future on the site of the former No. 100 Basic Training Centre at Portage la Prairie. It is expected that the retraining centre will take in Navy, Army and Air Force casualties. Lieut.-Col. Guyatt, who in civil life is a member of the medical faculty of the University of Toronto came here from Oakville, Ont., where he had been second-in-command of the casualty retraining centre there.

Construction of a new 150-bed military hospital is under way at Brandon. It will replace the 50-bed centre now in use, and will be opened shortly after the New Year. Completely equipped with the latest x-ray equipment, the new hospital will house a large physiotherapy department as well as medical and surgical departments.

Dr. B. Dyma, Winnipeg, was elected head of the newly organized Ukrainian Professional and Businessmen's Club. He presided at their second dinner meeting on December 16 in the St. Regis Hotel.

The contract for construction of a \$12,000 addition to the nurses' quarters at Deer Lodge Military Hospital has been awarded to Fraser MacDonald and Company, Winnipeg. A considerable addition to the hospital is already under construction.

Dr. F. W. Jackson, Deputy Minister of Health in Manitoba, has been appointed chairman of a committee to investigate the living conditions of Japanese in inland British Columbia.

The health committee of the Winnipeg city council has decided to ask for legislation to enable the city to give free treatment for communicable diseases. Free treatment of tuberculosis patients was adopted last winter.

Officers and nursing sisters played host to children of the Royal Canadian Army Medical Corps stationed at Fort Osborne Barracks on December 22. No. 10 District Depot band provided music for the occasion.

Dr. M. S. Lougheed, Winnipeg's Medical Health Officer, has suggested to the health committee that three district health centres be erected in Winnipeg, one in each ward, at an estimated cost of \$30,000 each. The committee decided on December 22 to ask the finance committee for money to construct one as soon as possible, the others to be erected after the end of the war. Each is to be a health teaching centre. The main use would be for the well-baby clinics now accommodated in church and school basements. The structure, one storey high will be 96 feet long and 36 feet deep. The plans call for a waiting room 18 x 34 feet, a demonstration room for young mothers, two examination rooms, a doctor's and nurses' consulting room, an x-ray room, a dentist's office, a small kitchenette, a record office, offices for the

nurses and an office for health inspectors. Dr. Lougheed says that these health centres would decentralize the work of his department and make for greater efficiency.

ROSS MITCHELL

New Brunswick

A campaign has been launched in Sackville, N.B., to collect funds to build a cottage hospital in connection with the medical centre recently organized by three of the doctors in the community, Dr. C. L. Gass, Dr. G. M. McFarlane and Dr. E. W. Barnhill.

Dr. S. R. D. Hewitt, superintendent of the Saint John General Hospital resigned his appointment effective January 1, 1944. Dr. Hewitt had been on leave of absence for a year due to ill health.

Dr. G. B. Peat, Provincial Commissioner of the St. John Ambulance Brigade for New Brunswick recently circularized the physicians of the province on the Brigade's blood grouping campaign. The letter covered the aims and advantages of this scheme of voluntary blood grouping and registration of results as it affected the physician and the community.

The press of New Brunswick has in the last few days given great prominence to the court martial of three physicians, Lieut.-Col. H. E. Baird of Chipman, Capt. G. G. Alleyn of Quebec City and Capt. N. Littner of Toronto, all members of the R.C.A.M.C. stationed in Fredericton, N.B., following the illness and subsequent death in a diabetic coma or of, possibly, some intercurrent complication, in the Fredericton Military Hospital in September, 1943.

The public and press have been invited to attend the court martial. The physicians of New Brunswick feel that the unusual publicity given to this investigation is unjust to the reputation of these doctors engaged in the service of this country previous to the decision of the court as to their guilt or innocence being established.

Errors in judgment, by those in authority during the prosecution of a war, whereby lives are lost are usually considered as a national hazard or consequence of warfare and such error is viewed leniently and criticism is usually academic. But when a military doctor is even accused of error or negligence as in this case, full scope is given to press and public to pillory the doctor who, in the multitude of decisions made daily in the course of his duty, has made one decision which to the minds of his superiors seems unsound. This savors of class persecution.

The number of cases of diphtheria reported to health authorities is increasing and several of the victims have shown laryngeal involvement. Health officers are increasing their efforts to educate parents of the necessity of taking advantage of free immunization provided by the provincial department of health.

The Provincial Laboratory reports that samples of milk from the Saint John area show much improvement, due to intensive efforts of the health officials and co-operation on the part of the dairy management. Lack of trained dairy workers and other war time difficulties for a time presented a serious health problem. The preparation of homogenized milk was banned for the duration of the war to conserve workers' time for the more simple process of pasteurization.

A. STANLEY KIRKLAND

Nova Scotia

Major Clarence M. Bethune, R.C.A.M.C., Halifax, has received the M.B.E. (Military Division).

Dr. M. R. Elliott, of Wolfville, has been recently receiving treatment for his eyes at the Royal Victoria Hospital, Montreal.

Also on the sick list is Dr. M. G. Tompkins, of Dominion, who has spent the last several weeks in the Halifax Infirmary.

Dr. J. R. Corbett, until recently practising in Shelburne, has left the Province and is now settled in Summerside, P.E.I.

Dr. H. K. MacDonald, of Halifax, was recently ill with pneumonia, but is convalescing rapidly and after a "little run to Montreal" hopes to resume his usual activities.

In the Town of New Waterford the majority of medical practice is conducted under the check-off system. Each coal company employee subscribes to the doctor of his choice and the employer under certain conditions deducts the amount from the employee's pay and sends it to the doctor. Since the war, in one or more instances, physicians have gone into the Services leaving substitutes. Apparently this has not been a source of complaint to the subscribers.

Recently, however, differences arose between the physicians and some of the subscribers. The matter was given some publicity in the local press. It is hoped that by this time matters have been adjusted to the satisfaction of all parties.

In any case, the circumstances should be of interest to all who are studying National Health Insurance, since the set-up in New Waterford is comparable to some of the proposed set-ups in a National Health Insurance scheme. Anything which disturbs the relationship between the doctor and his patients should be carefully scrutinized and, if possible, prevented in forming legislation. Differences of opinion are bound to occur under the best set-up, but arbitration by an independent body should be favourably considered.

Speaking in general terms, and having no reference to the local situation in New Waterford, the person who pays a physician directly or indirectly through an insurance plan has the right to expect the best that doctor can give him. At the same time every protection must be given the medical man to exercise his discretion and freely express his well considered opinions without prejudicing his livelihood. If this is not done, personal popularity rather than professional integrity will determine the doctor's income, and the profession will suffer within itself and in the eyes of the public.

H. L. SCAMMELL

Ontario

In the New Year's list of honours granted by His Majesty the King Dr. Duncan Graham, Professor of Medicine, University of Toronto, and Surgeon-Commander C. H. Best, Professor of Physiology were awarded the decoration of Commander in the Order of the British Empire. Dr. Graham has administered his department with singular success for twenty-five years. He has inspired and encouraged research in clinical medicine and served for the first three years of the war as adviser to the Minister of Defence. The profession at large is gratified by the distinction, as Dr. Graham became widely known throughout Canada when he served as President of the Canadian Medical Association.

Commander Best is internationally famous for his work on insulin. One of his outstanding contributions to the war effort has been his researches in nutrition in the Royal Canadian Navy and many other studies of equal importance, but less popular appeal.

Dr. Leslie Kilborn, Dean of the Department of Medicine in the University of West China, has returned to Canada with his family. His wife was formerly Dr. Janet McClure who is a sister and classmate of the incomparable "Bob" McClure, now in charge of the Friends' Ambulance Service somewhere in the Far East. The Kilborns were born in China when the parents of both served as medical missionaries.

"Burma Surgeon", by Dr. Gordon Seagrave, is a book that doctors should read. It gives an idea of medical practice under difficulties such as practitioners in Canada rarely encounter. Dr. McClure's book, when written, will outclass any story of adventure that most people have ever read and Dr. Kilborn has the makings of one almost as good. The story of the medical college in Chengtu is inspiring to Canadians, as the professors in the original staff were educated here and sent out from Canada.

Before his return Dr. Kilborn was adviser on Chinese affairs to General Victor Odlum, Canadian Minister to China.

Dr. R. P. Vivian, Minister of Health in Ontario, has given in addresses and interviews some idea of the legislation to be presented to the legislature when it assembles in February. Free hospital care and free access to all diagnostic facilities to every citizen is the basis upon which this legislation will be built. This is to be a first step toward the inauguration of a wide scheme to be considered later.

It has been observed that if a doctor survives the strain of practice until he passes fifty-five years of age he is liable to continue for a long time. Dr. W. J. Gunne, of Kenora, had his eighty-fourth birthday on December 19, 1943, and is still active and useful. He is the oldest medical officer of the C.P.R. in Canada. Dr. Gunne has been active in social matters having served on the Patriotic Fund Committee in the last war, on the Pensions Board and, for many years was chairman of the Old Age Pensions Board.

On December 20, 1943, Lady Banting, private in C.W.A.C. and 5th year student in medicine, christened a U.S.A. liberty ship in Baltimore, Md. The ship was named for the late Sir Frederick Banting and is the first in the history of the American Navy to be called after a Canadian.

The recent King's Birthday honours include the following:

Officers, Order of the British Empire (Military Division): Lt.-Col. Paul Alfred Turner Sneath, Royal Canadian Army Medical Corps, Toronto; Wing Cmdr. Wilbur Rounding Franks, Medical Aviation Research, R.C.A.F. Headquarters, Toronto. M. H. V. CAMERON

Quebec

The collection of blood for transfusion has become so well organized throughout the country that we are apt to take it for granted. And yet it is probable that many medical men do not realize how large the organization is, or what a volume of work is being handled. A visit to the Montreal Red Cross Blood Donors Clinic gives some idea of the character of what is being done.

Like most organizations of the kind, it has grown from small beginnings, and with a later start than some other similar organizations. It now occupies a large office area, excellently well laid out and able to handle a very large number of donors at a time. It operates for three days a week and one evening. It could do more if it could obtain more staff. One of the most striking things about the Clinic is the extraordinarily large number of helpers who give their services without charge. At the request of the Government the quota of donors to be aimed at for the Province of Quebec was 400 per week, but this has been surpassed by a considerable amount. One difficulty is the keeping up of public interest in the matter. Unless there is continued and repeated publicity the supply of donors rapidly falls off, so that every medium of publicity is taken advantage of, the daily papers, the radio, talks to companies, posters, and so on.

Jean Saint-Martin, Surgeon-Lieut. R.C.N.V.R. of 2364 Fullum Street, Montreal, has been mentioned in dispatches.



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A \$50,000 grant, payable \$10,000 annually for five years, has been voted to the St. Charles Hospital at Ste. Hyacinthe by the Provincial Government.

Durant les six premiers mois de 1943, la province de Québec enregistre 47,288 naissances vivantes, ce qui fait un taux de 27.6. Ce rapport préliminaire accuse une diminution de 865 naissances sur l'année précédente, mais il ne faut pas oublier que, pour cette période, les chiffres de 1942 sont complets. On a raison de croire que le total des naissances des six premiers mois de 1943 dépassera 49,000 quand tous les rapports auront été communiqués à la division de démographie du département de la santé et du bien-être social de la province.

Le démographe provincial estime qu'en 1943 on enregistrera pour les douze mois plus de 98,000 naissances, ce qui marquera une nouvelle augmentation de notre natalité. Si cet accroissement est général en Amérique, voire même en Angleterre, il semble qu'actuellement se manifestent des signes de fléchissement et d'arrêt dans quelques provinces et dans quelques états de la république voisine.

Il est assez difficile de prédire ce qui surviendra chez nous en 1944, mais on peut présentement se rendre compte que la nuptialité n'a aucune tendance à décroître.

Durant ce premier semestre de 1943, nous comptons 1,300 mariages de moins que durant la même période de 1942; les mêmes estimés anticipés permettent de constater que, durant juillet et août, les mariages ont été très nombreux, égalant presque le nombre des naissances.

JEAN SAUCIER

Saskatchewan

An informal get-together of the medical men of the Saskatoon and District Medical Society, was held at the home of Dr. H. D. Hart, on December 28, 1943, for the purpose of honouring Dr. A. W. Argue, our present registrar, who, on December 29, reached his eighty-first birthday; and Dr. P. D. Stewart, who this year completes forty-one years of practice in Saskatoon and District.

Dr. Argue was introduced by Dr. F. W. Hart, of Indian Head, Sask., who mentioned his years of association with Dr. Argue and commended him upon his years of service, excellent character, and for the interest he manifested—not only in the community of Grenfell, Sask., where he practised for forty-three years—but also in general medical problems.

Dr. P. D. Stewart was introduced by Dr. John Valens, of Saskatoon, Sask., who mentioned his early years of association with Dr. Stewart, and the difficulties of practice in the early days on the prairies.

Doctor Argue, in replying, expressed his appreciation of the good-will expressed toward him and the co-operation he had had from the medical men since becoming registrar.

Doctor Stewart expressed his pleasure on being remembered on this occasion, and briefly mentioned the changing tendency in the medical practice of today.

During the evening Dr. J. S. Brown entertained the gathering with movies and stills of a trip to California, while Dr. H. D. Boughton and Dr. I. H. Herman favoured the medical men with musical numbers.

Dr. Jack Valens, son of Dr. John A. Valens, of Saskatoon, is now spending a three weeks' vacation at his home in this city. Dr. Jack Valens is an intern in the Orthopaedic Hospital in Los Angeles, California.

Dr. Ernest Talbot, who is now a medical officer in a munitions plant a short distance from Montreal, left on January 9, to resume his duties in the East, after having spent a short visit in Saskatoon. Dr. E. Talbot was formerly on the intern staff of the Saskatoon City Hospital.

A new member was recently added to the College of Physicians and Surgeons, namely, Dr. Harley D. Jenner,

who is now on the Provincial Sanatorium staff in Prince Albert, Sask. He is a graduate of Toronto (1933).

H. D. HART

General

University of London.—The Senate invite invitations for the University Chair of Anatomy tenable at St. Mary's Hospital Medical School (salary £1,300). Applications (10 copies) must be received not later than the first post on Monday, March 20, 1944, by the Academic Registrar, University of London, c/o Richmond College, Richmond, Surrey, from whom further particulars should be obtained.

The American College of Surgeons announces the following initiates for the year 1943:

New Brunswick.—George E. N. Chalmers, Fredericton; Lachlan Macpherson, East St. John.

Ontario.—Gordon S. Foulds, Toronto; G. Arnold Henry, Toronto; Cecil W. Kelley, Ottawa; Robert E. Smart, Ottawa; J. A. Leo Walker, Windsor.

Quebec.—Guy Bertrand, Sherbrooke; Harold S. Dolan, Montreal; Kenneth E. Dowd, Montreal; Edmond Dubé, Montreal; J. Urgel Gariépy, Montreal; Léon Gérin-Lajoie, Montreal; James E. McArthur, Noranda; Herbert F. Moseley, Montreal; G. Stuart Ramsey, Montreal; Dudley E. Ross, Mt. Royal.

Book Reviews

After Effects of Brain Injuries in War. K. Goldstein. 244 pp. \$6.25. Heinemann, London; Macmillan, Toronto, 1943.

This book, as its title indicates deals essentially with a description of the author's psychological tests and of their value in the assessment of defective cerebral function caused by head injury. These tests were devised primarily in the study of German soldiers wounded in the 1914-1918 war. Many of these patients were under prolonged observation by the author and this book is, therefore, of value in recording the end-results of his treatment. He advocates long treatment, as some of his cases showed continuous improvement for years after their injury. The author used a unit, comprising the hospital, the psychological laboratory, the school and the workshop in successive stages of the treatment.

The psychological tests are well described and illustrated. They are simple in plan and do not require elaborate equipment. The results of the abstract tests showed a high degree of conformity with those subsequently obtained in the workshop. The workshop should be organized as far as possible on the lines of regular labour. The work should have a market value and the patient should be paid for its performance. Piecework is recommended.

The book ends with a chapter on Social Adjustment in which the author's results are well summarized. There is a valuable bibliography. It should be very useful to those engaged in the treatment and rehabilitation of cases of head injury, whether sustained on service or in civilian practice.

The Modern Treatment of Syphilis. J. E. Moore. 2nd ed., 717 pp., illust. \$9.50. Thomas, Springfield, Ill.; Ryerson Press, Toronto, 1943.

The first edition of this book appeared in 1933. The second edition appeared in 1941, completely revised and enlarged, and containing a large amount of new and valuable information. The popularity of this work and its need are attested by the fact that a second printing of this edition has now appeared.

This second printing has a new chapter added, Venereal Disease Control in the Army and Navy.



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Further, Chapter xxxiii, Intensive Arsenotherapy of Early Syphilis, has been completely rewritten.

The chapter on intensive arsenotherapy gives a full exposition of the results obtained to date on both the intravenous drip and the multiple injection methods. The authors are apparently not advocates of this method because of the high incidence of encephalography. Based on the work of Eagle, they suggest modifications which would compress treatment into a term of weeks instead of days. The reviewer does not believe that the writers, in evaluating massive arsenotherapy, have taken into sufficient consideration the need for this form of therapy in selected patients, such as transients, seamen and members of the armed services. Be that as it may, the institution of massive arsenotherapy has at least emphasized the need and hastened the advent of shortened forms of therapy for early syphilis. Venereal disease control in the army and navy is discussed in some detail, particularly its relation to civilian life.

The author and his co-workers are entitled to a great deal of credit for their industry in keeping their masterly work up to date. This book should be in the library of every physician who treats syphilis.

Fundamentals of Health. E. C. Robertson. 283 pp., illust. 95c. Copp Clark Co., Toronto, 1943.

This little volume is written to serve as a text in hygiene for high-school pupils. Hygiene, as it is taught to non-medical persons, can be divided into two broad sections; one dealing with personal hygiene, the other with community or public hygiene. This is the way this book is divided. The section on personal hygiene deals with the anatomy and physiology of the various systems of the body, and the common diseases associated with them. Prevention is, of course, stressed. Notably absent is the hygiene of sex. It is assumed that this omission is deliberate.

In the discussion of public hygiene, the subject is introduced by a historical sketch. Some specific diseases are then briefly described, and an outline of modern health organization is given.

Criticisms which occur to the reviewer are these. In the personal hygiene section, it would seem that much more emphasis should have been laid on obesity. The time to prevent obesity is in youth, and since obesity is an extremely important problem in middle age, it is desirable to warn young people concerning it in no uncertain terms. The author has wisely recommended the cultivation of hobbies, but has not stressed particularly the desirability of developing habits of physical exercise which can be continued when school and college days are over.

In the public hygiene section, it seems that a better case for the necessity of public health programs could have been made if, in addition to the historical sketch, a few vital facts with respect to life expectancy and disease control could have been given. Some mention, too, of the cost involved in prevention might be made. From the point of view of the public health administration it is important that youth should be seized of the triumphs of preventive medicine and should be willing, when they become taxpayers to pay the cost.

These criticisms are intended as suggestions for future editions. The information given throughout the book is accurate and conservative. The style is interesting and easily understood, and the illustrations are good and well chosen.

Whooping Cough. J. H. Lapin. 238 pp., illust. \$6.25. Thomas, Springfield, Ill.; Ryerson Press, Toronto, 1943.

Dr. Lapin, who is associated with the whooping-cough clinic of the Bronx Hospital in New York, has perhaps a far greater personal experience with the disease than most medical men.

He has combined in this monograph the fruits of that experience with an exhaustive study of the writings of other investigators on all phases of whooping-

cough. All statistics agree that at the present time whooping-cough is responsible for more deaths than any of the other contagious diseases of childhood.

Carriers are found but rarely. Mild or missed cases have been demonstrated by investigators. A majority of workers agree that *H. pertussis* is the etiological factor in pertussis. *H. pertussis* is a uniform species, without type variations, but with different phases of existence. It is subdivided mainly into virulent phase I organisms and avirulent phase II organisms. There is still no general agreement among pathologists concerning the initial lesion in the respiratory tract or the exact nature of the anatomical change observed in cerebral complications.

In a long chapter on immunology, the author states that it seems probable that protection against whooping-cough is antibacterial rather than antitoxic. His comments on a skin test for susceptibility to whooping-cough after an examination of the literature are not favourable. Until further work has been done, skin testing in the human must remain an unpredictable mixture of immune response and allergic response.

There are excellent chapters under Clinical Manifestations, Haematology, Roentgenology, Complications, and Diagnosis with adequate illustrations. In the final chapters the author carefully and impartially reviews the literature on the prophylaxis and treatment of whooping-cough and its complications, stating his own methods and results at the same time.

Pain Mechanisms. W. K. Livingston. 253 pp., illust. \$3.75. Macmillan, Toronto, 1943.

This thoughtful monograph presents a study of some common pain problems which confront the surgeon in normal times, and which become of major importance in wartime, and during any post-war period. The author has had wide practical experience as a neurosurgeon in dealing with industrial cases.

The book opens with a short review of the anatomy and physiology of pain-sensation, and some consideration of the psychology of pain. It is a clearly written account of a difficult and controversial subject. In the main body of the text are discussed: causalgia, what are called "minor causalgias", other vaguer post-traumatic pain syndromes, phantom-limb pain, and hyperalgesias.

The author is concerned particularly with understanding the underlying mechanisms of the various pain syndromes, with a view to rational treatment. In his experience, many painful post-traumatic states have been blamed too readily on psychological factors, and can now be shown to depend upon physiological disturbances which can be dealt with directly. In this connection, he has had considerable success with novocaine infiltration of painful areas, as well as novocaine block of sympathetic ganglia.

One cannot say that the book adds much in the way of new thinking on the subject of causalgia and related states. Rather, is it an excellent and thought-provoking review of important facts, theories and past experiences, brought up to date. One hopes that younger surgeons and neurosurgeons on active service will read it carefully, and be stimulated to more thoughtful and successful handling of problems of pain among the wounded than has been possible in the past.

Nutritional Deficiencies. J. B. Youmans. 2nd ed., 389 pp., illust. \$6.00. J. B. Lippincott, Montreal, 1943.

In the preface to the first edition it was stated that this book was meant to bring together in a useful and critical fashion such information as was necessary or helpful to an understanding of nutritional deficiencies. In the present edition, which is the second, some errors in the first are corrected and new material added. The main deficiencies dealt with are those of the vitamins, protein, iron and iodine.

It is not an exaggeration to say that the author has carried out his plan with much success and has

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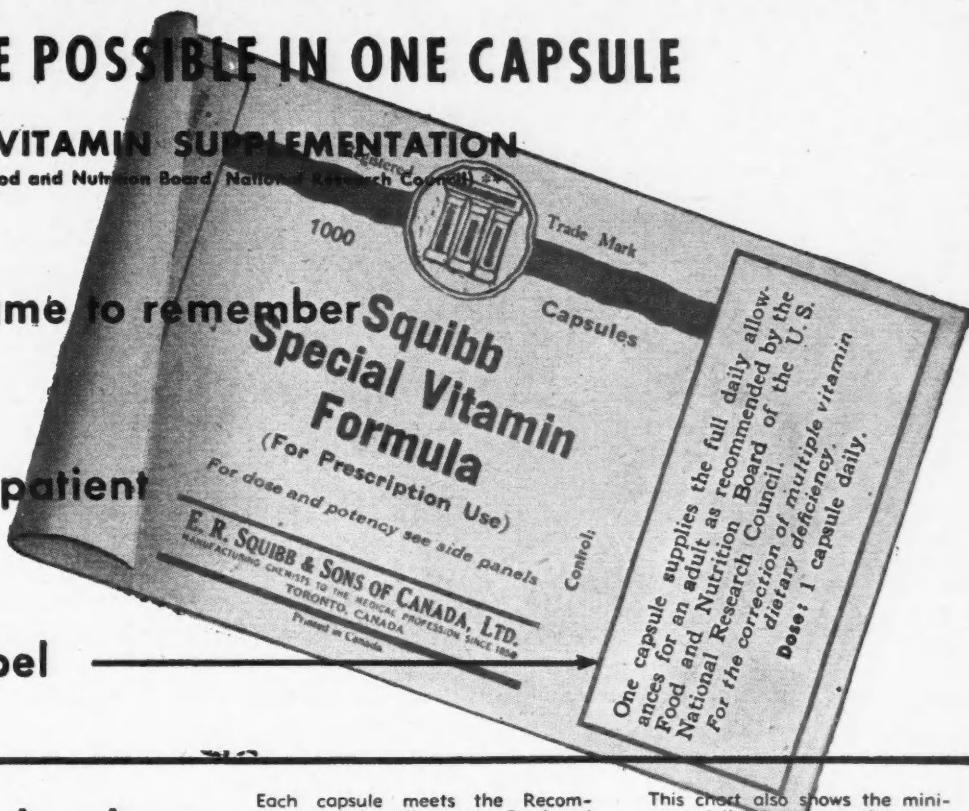
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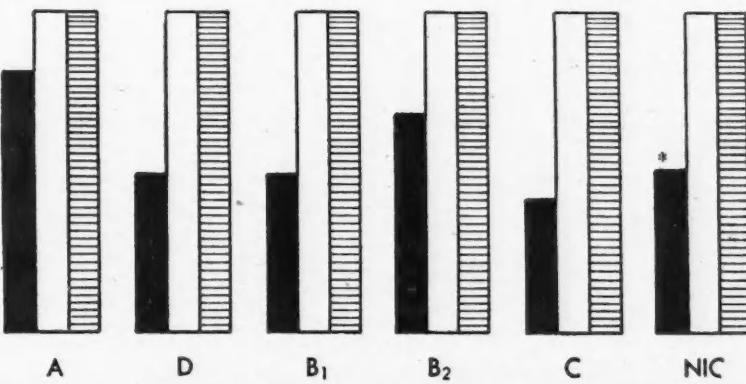
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managed to arrange in an orderly way the conclusions he has come to from an apparently extensive examination of the almost countless number of articles that have been published on the various phases of his subject. In addition he has put in three sections giving a summary of the vitamins and the laboratory diagnosis of deficiency diseases and has also provided a good index. The writing, although in places somewhat less than elegant, is clear enough to prevent any serious mistake arising in the mind of the average reader who has to face the problem of diagnosis and treatment of diseases that have, or are now assumed to have, a nutritional basis.

Total war has not only removed many personal liberties but has also allowed certain enthusiasms to range unrestrained. Thus there has arisen an almost strident clamour regarding the national dietary needs and this clamour is partly responsible for some rationing regulations that will appear needless and probably absurd when they can be calmly considered in days of peace. To oppose or criticize these regulations is at present a thankless and futile task, but this author must be commended because he has judiciously refrained from increasing the confusion. The cautious clinician who is quietly striving to keep therapy on a foundation of common sense will find comfort in the sanity and moderation of the book and the busy practitioner who is deluged and bewildered by the claims of nutritionist and vitaminist can turn to it with much confidence and should obtain a large measure of relief.

The Principles and Practice of Industrial Medicine.
Edited by F. J. Wampler. 579 pp., illust. \$7.20.
Williams & Wilkins, Baltimore; University of
Toronto Press, Toronto, 1943.

This book is timely. It is written by 33 in a field of medical practice that has been cultivated for about only ten years. Surgery has been identified with industry for a long time and Workmen's Compensation Boards were chiefly concerned with accidents until the need for special studies on disease arising out of industry forced itself upon the attention of medical men and employers of labour. The hazards to health in a multiplicity of industries are clearly set forth and preventive and curative methods are elaborated into a book that is an authoritative vade mecum to any physician who undertakes the duty of "plant doctor".

Thirty-three essays are too many to epitomize in a review of ordinary length. Among other subjects they deal with industrial accidents—cause and prevention, effects of temperature and humidity on industrial workers, abnormal atmospheric pressure, zinc chemicals, occupational poisoning, lead, carbon disulfide, toxicity of certain organic solvents, poisonous gases, occupational diseases of the skin, pneumoconiosis, tuberculosis, traumatic shock and burns, nutrition and rehabilitation. Few practitioners know much about the early recognition of occupational disease in general and most medical men would be astonished by the large number of manufacturing processes that carry a heavy risk to the health of working people. Moreover it has involved much difficulty for most physicians to learn the best method of treating patients suffering from some of these diseases.

The book is warmly recommended.

Managing Your Mind. S. H. Kraines and E. S. Thetford. 374 pp. \$2.75. Macmillan, Toronto, 1943.

This book has evidently been written for the general public but will be of real value to the medical practitioner who is interested in the manner in which emotional problems gain expression in physical complaints. The authors repeatedly attempt to indicate that mental health is dependent upon intellectual objectivity and emotional stability. Considerable detailed discussion is devoted to the methods of achieving maturity, self-reliance and developing a realistic

philosophy of life. A closing chapter on "Changing Social Nature" emphasizes the importance of teaching children the technique of thinking, and of emotional control. The avoidance of technical terminology and the relatively simplified manner in which the material in this book is presented will make it a particularly useful aid in the treatment of numerous physical and mental problems which are found in psychoneurotic patients.

Psychological Medicine. D. Curran and E. Guttmann. 188 pp., illust. \$3.00. E. & S. Livingstone, Edinburgh; Macmillan, Toronto, 1943.

The authors of this convenient small textbook are to be complimented on producing a satisfactory "short introduction to psychiatry". It includes a useful appendix on the psychiatric problems of wartime, an excellent index, and twenty-one well selected illustrations. It covers all the common problems, and one would have to have considerable experience and do a good deal of reading to learn more than this book contains.

There are seventeen chapters; five are devoted to general features of etiology, examination methods and treatment, seven are concerned with specific disorder types, while the last five cover war casualty problems.

The authors give numerous cross references. This avoids repetition and allows them to keep every part of the book informative, easily read, and at the same time useful. One will find concise and practical guides to diagnosis and treatment. Those procedures easily provided, are described in detail while the indications for, and the essentials of, special major types of treatment are clearly outlined. The reviewer would suggest that in future editions the asthenic habitus should be pictured with the pyknic and athletic. An interpretation of at least one of the symbolic drawings would add interest to these excellent examples.

This book can be recommended to students and service physicians without reservation and it could be read with pleasure and profit by any physician.

BOOKS RECEIVED

Synopsis of Paediatrics. J. Zahorsky. 4th ed., 431 pp., illust. \$5.25. Mosby, St. Louis; McAinsh, Toronto, 1943.

Introduction to Organic and Biological Chemistry. L. E. Arnow and H. C. Reitz. 736 pp., illust. \$5.00. Mosby, St. Louis; McAinsh, Toronto, 1943.

La Electroencefalografia. V. Santamarina. 170 pp., illust. Cardenas Y Compania, La Habana, 1943.

Diseases of the Nose, Throat and Ear, Medical and Surgical. W. L. Ballenger and H. C. Ballenger. 8th ed., 975 pp., illust. \$13.75. Lea & Febiger, Philadelphia; Macmillan, Toronto, 1943.

Lippincott's Quick Reference Book for Nurses. H. Young. 5th ed., illust. \$2.25. Lippincott, Montreal, 1943.

Clinics. Vol. 1, No. 5. Edited by G. M. Piersol. 278 pp., illust. \$3.00. Lippincott, Montreal, 1943.

Convulsive Seizures. T. Putnam. 168 pp., illust. \$2.50. Lippincott, Montreal, 1943.

Clinics. Vol. 1, No. 6. Edited by G. M. Piersol. 347 pp., illust. \$3.00. Lippincott, Montreal, 1943.

An Introduction to Clinical Perimetry. H. M. Traquair. 4th ed., 332 pp., illust. \$6.50. Henry Kimpton, 26 Bloomsbury Way, London, 1942.

Food Inspection Notes. H. Hill and E. Dodsworth. 122 pp. 6s. H. K. Lewis, London, England, 1943.

Clinics. Vol. 2, No. 2. Edited by G. M. Piersol. 361 pp., illust. \$3.00. Lippincott, Montreal, 1943.